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CONCERNING LANDAU'S COLOR TEST FOR SERODIAGNOSIS OF SYPHILIS *

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PHILADELPHIA

Recently Landau[1] has described an iodin color reaction in syphilis for which he claims a high degree of specificity as compared with the Wassermann reaction. On account of the simplicity of the test and the claims made it has attracted considerable attention, so that I have thought it advisable briefly to record my observations, although they have not by any means substantiated Landau's claims and show the test to be without practical value.

Landau at first used iodized petrolatum for the test, prepared by mixing 5 drops of tincture of iodin in 10 c.c. of paraffin oil. To 0.2 c.c. of the serum was added 2.5 c.c. of this reagent and the test tube set aside in a dark place for from five to fifteen hours. Syphilitic serum, it is claimed, decolorizes the mixture, while the color persists a reddish yellow with normal serum.

With this method Landau examined the serums of 90 persons regarded as syphilitics; of these 49 reacted positively with the Wassermann reaction and 55 with the iodized petrolatum test. Of 32 controls regarded as nonsyphilitic, all reacted negatively with the Wassermann reaction while 1 (a case of ulcis cruris) reacted positively with the iodin test.

Later[2] the technic was modified and a 1 per cent. solution of iodin in tetrachlorid of carbon employed. To 0.2 c.c. of the fresh, clear serum is added 0.01 c.c. of the iodin reagent; they are well mixed until all color disappears from the reagent and then set aside in a dark place for four hours at room temperature. With the serum of a syphilitic the fluid is a clear transparent yellow; with a nonsyphilitic serum the fluid becomes a whitish gray and is opaque.

Because of the frequent difficulty of reading the results, the addition of starch paste to the mixtures has been advocated as a means for detecting unbound iodin in the serums, as indicated by the development of a blue color. Negative tests, therefore, are supposed to be indicated by a blue color and positive tests by no change of color on the addition of starch. I have also used this technic in the examination of a number of serums, but have not found it of any aid in interpreting the reactions, so that the iodin reaction was found far inferior to the Wassermann reaction in the practical diagnosis of syphilis, although it may possess considerable theoretical value and interest.

Landau has advanced no adequate explanation of these reactions, but was apparently influenced in his researches by the chemical physiologic reactions of Meier and Porges, Fornet and Schereschewsky, Herman and Perutz, Klausner, Ascoli, Schurman and others who have advocated various floccule, precipitin and color reactions in the diagnosis of syphilis, on the basis that the Wassermann reaction itself is a colloidal chemical reaction with lipoidal substances.

While Landau has not laid down more definite directions, I have conducted his tests in this investigation as follows:

TECHNIC

(a) Clear corpuscle-free serums were employed. Opalescent serums, as those obtained by bleeding shortly after a meal, are not adapted for the method, especially with the iodin tetrachlorid of carbon technic. Practically all serums were used in a fresh active condition and also after heating or inactivation at 56 C. for one-half hour. Serums deeply stained with hemoglobin were found unsatisfactory and were discarded.

While Landau did not report on the results of the examination of cerebrospinal fluids, I have examined a number with both reagents, and with these the results were even more inconsistent than with serums.

(b) With the iodized petrolatum method the exact technic of Landau was observed; with the iodin tetrachlorid of carbon method I have modified his technic to this extent, that five times the quantities of serum and reagent were used in order to observe the reaction in a larger volume. With the quantities he advised, namely, 0.2 c.c. serum and 0.01 c.c. reagent, the bulk is quite small even in the small test tubes ordinarily in use in a laboratory; whereas with 1 c.c. of serum and 0.05 c.c. reagent the readings are much easier and more definite. With the iodized petrolatum technic, readings were made at the end of fifteen to eighteen hours; with the iodin tetrachlorid of carbon technic, at the end of four hours and again after twenty-four hours at room temperature.

The starch test for unbound iodin was applied by the addition of 0.5 c.c. of a 1 per cent. solution of starch in distilled water. This amount of starch gives a distinct blue color in the sediment when added at once to a mixture of serum and iodin reagent. In the tests I have added the starch after the mixtures of serum and iodin tetrachlorid of carbon reagent have stood four hours at room temperature, and in some tests at the end of twenty-four hours. With few exceptions no change of color was perceptible, regardless of whether the serum was from a normal or luetic person. Thus, of 58 serums tested in this manner, 20 yielded positive Wassermann reactions; 38 yielded positive iodin reactions. After four hours the addition of starch to the 58 serums showed a faint blue reaction characterized by a few blue granules, not easily seen in but six tubes, and four of these occurred in clear serums or positive reactions according to Landau.

(c) All serums and cerebrospinal fluids were tested for the Wassermann reaction with three different antigens,

* From the Laboratories of the Philadelphia Polyclinic and College for Graduates in Medicine.

1. Landau, W.: Untersuchungen über eine Reaktion luetischer Sera mit einem Jodal Reagens, Wien. klin. Wchschr., 1913, xxvi, 1702.
2. Misc. Abst., THE JOURNAL A. M. A., Oct. 10, 1914, p. 1317.

namely, an alcoholic extract of human heart, reenforced with cholesterin, an alcoholic extract of syphilitic liver and an extract of acetone-insoluble lipoids of human heart. I have tabulated the results according to the Wassermann reaction, for the histories and diagnoses of the patients tested were at times incomplete and uncertain and in none of the cases regarded clinically as syphilitic was the Wassermann reaction negative.

RESULTS

(a) *With the Iodized Petrolatum Reagent.* — Twenty-five serums and five cerebrospinal fluids were tested with this reagent. As will be noted in the table, the addition of serum to this reagent practically always resulted in the mixture becoming lighter in color, irrespective of whether the serum was of a luetic or normal person. In some instances the shades and degrees of decolorization were different, but not consistent in regard to the nature of the serum derived from a syphilitic or nonsyphilitic person. Normal as well as syphilitic serums were found to decolorize the reagent to an equal degree. Cerebrospinal fluids, on the other hand, produced slight or no change in the color of the mixture, regardless of whether they were from a luetic or nonluetic person.

(b) *With Iodin Tetrachlorid of Carbon Reagent.*— With this reagent I examined 162 serums and fifteen cerebrospinal fluids. The former were tested in a fresh active condition and again after heating at 56 C. for half an hour. Readings were made after standing four and again twenty-four hours at room temperature.

In examining most of the serums listed I used the technic adopted, which requires five times the quantities of serum and reagent given by Landau. Even under these circumstances it was usually a difficult matter to interpret and read the results. In most instances a portion of unused serum of each specimen was employed as a control to determine the presence of faint degrees of cloudiness or to read a serum very faintly opalescent in its natural or unused state.

As already stated, the results are expressed according to whether the Wassermann reaction was positive or negative. All of the serums reacting positively in the Wassermann reaction were from persons in the secondary, tertiary or latent stages of syphilis; three were of congenital syphilis; none was in the primary stage. A few were not diagnosed by the attending physician.

The iodin reactions were conducted with fresh active serums and again after heating the serums at 56 C. for thirty minutes. Readings were made after four hours, and again at the end of twenty-four hours, the tubes remaining at room temperature.

The results observed are summarized as follows:

1. WASSERMANN POSITIVE SERUMS

1. Of seventy-four serums yielding positive Wassermann reactions fifty-three, or 71.6 per cent., reacted in a fresh active condition, reacted positively in the iodin test as read at the end of four hours; at the end of twenty-four hours a few serums became cloudy and thereby reduced the percentage of positive iodin reactions to about 68 per cent.

2. The iodin reactions with heated serums and those more than twenty-four hours old yielded results quite similar to those tested in a fresh active condition, in that 72 per cent. were positive.

3. In general the iodin reaction was negative in about 28 per cent. of serums yielding positive Wassermann reactions and regarded as from luetic persons.

2. WASSERMANN NEGATIVE SERUMS

The error of the iodin reaction is even greater with serums of normal persons and those suffering with diseases other than syphilis, in that a relatively high proportion, at least 70 per cent., react positively.

1. Of sixty-one serums reacting negatively in the Wassermann reaction and tested with the iodin reagent in a fresh, active condition, but eighteen, or

RESULTS OF LANDAU'S IODIZED PETROLATUM TEST WITH SERUMS AND CEREBROSPINAL FLUIDS REACTING POSITIVELY AND NEGATIVELY IN THE WASSERMANN REACTION

No.	Diagnosis	Wassermann Reaction			Landau's Reaction	
		Cholesterinized Alc. Ext. Human Heart	Alc. Ext. Syph. Liver	Acetone Insol. Lipoids	Active Serum	Inactivated Serum
1	Secondary syphilis	+ + + +	+ + + +	+ + + +	Partial decolorization	Partial decolorization.
2	Secondary syphilis	+ + + +	+ + + +	+ + + +	Partial decolorization	Partial decolorization.
3	Secondary syphilis	+ + + +	+ + + +	+ + + +	Almost colorless	Almost colorless.
4	Secondary syphilis	+ + + +	+ + + +	+ + + +	Partial decolorization	Partial decolorization.
5	Tertiary syphilis	+ + + +	+ +	+ + +	Partial decolorization	Partial decolorization.
6	Secondary syphilis	+ + + +	+ +	+ + + +	Partial decolorization	Partial decolorization.
7	Acute arthritis	—	—	—	Partial decolorization	Partial decolorization.
8	Acute gonorrhea	—	—	—	Almost colorless	Almost colorless.
9	Secondary syphilis (salvarsan)	+ +	—	—	Partial decolorization	Almost colorless.
10	Acute gonorrhea	—	—	—	Almost colorless	Partial decolorization.
11	Acute gonorrhea	—	—	—	Almost colorless	Partial decolorization.
12	Pneumonia	—	—	—	Partial decolorization	Almost colorless.
13	Acute endocarditis	—	—	—	Almost colorless	Colorless.
14	Tertiary syphilis	+ + + +	+ + + +	+ + + +	Partial decolorization	Partial decolorization.
15	Secondary syphilis (salvarsan)	+ + +	+	+ +	Partial decolorization	Almost colorless.
16	Infant feeding case	—	—	—	Partial decolorization	Colorless.
17	Sarcoma	—	—	—	Partial decolorization	Partial decolorization.
18	Chronic gonorrhea	—	—	—	Partial decolorization	Partial decolorization.
19	Paresis	+ + + +	+ + +	+ + +	Almost colorless	Colorless.
20	Tabes dorsalis	+ + + +	+	+ +	Partial decolorization	Partial decolorization.
21	Normal rabbit serum	+ + +	+ +	+ +	Partial decolorization	Partial decolorization.
22	Normal rabbit serum	+ +	+	+	Partial decolorization	Partial decolorization.
23	Normal dog serum	+	+	±	Partial decolorization	Partial decolorization.
24	Normal dog serum	+	±	—	Partial decolorization	Partial decolorization.
25	Normal dog serum	—	—	—	Partial decolorization	Partial decolorization.
26	Cerebrospinal fluid	+ + + +	+ + + +	+ + + +	Practically no change	
27	Cerebrospinal fluid		—		Practically no change	
28	Cerebrospinal fluid	+ + +	+ +	+ + +	Practically no change	
29	Cerebrospinal fluid	+ + +	+	+	Slightly decolorized	
30	Cerebrospinal fluid	—	—	—	No change	

29.5 per cent., reacted negatively as read at the end of four hours.

2. Of even greater importance, therefore, is the observation that about 70 per cent. of nonluetic and Wassermann negative serums yield falsely positive iodin reactions.

3. With heated or inactivated serums the iodin reaction at the end of four hours yielded results quite similar to those observed with fresh serum, in that 26 per cent. were negative, and thereby in agreement with the Wassermann reaction.

With cerebrospinal fluids the results were entirely unsatisfactory. Practically all fluids reacted alike; that is, the color persisted in the reagent collected in the bottoms of the test tubes and the fluids remained clear irrespective of whether they were from luetic or nonluetic persons. Of fifteen fluids tested, six gave strongly positive Wassermann reactions and nine reacted negatively, but as stated, all reacted in a similar manner when tested with iodin in tetrachlorid of carbon reagent.

SUMMARY

1. Of eleven serums of persons and four of normal rabbits and dogs reacting positively, and of ten reacting negatively in the Wassermann reaction, the tests with Landau's iodized petrolatum were entirely unsatisfactory. Both normal and luetic serums alike were found to produce partial decolorization of the reagent, and complete decolorization was likewise observed with both normal and luetic serums. The results with active and inactivated serum were practically similar.

2. Cerebrospinal fluids of both syphilitic and nonsyphilitic persons tested with iodized petrolatum produced similar results, in that both alike caused little or no change of the reagent.

3. With the iodin in tetrachlorid of carbon reagent the results with fresh active serums after standing four hours at room temperature, as directed by Landau, were as follows:

(a) Of seventy-four serums giving a positive Wassermann reaction, 53, or 71.6 per cent., gave a positive iodin reaction.

(b) Of sixty-one serums giving a negative Wassermann reaction, 18, or but 29.5 per cent., gave a negative iodin reaction. As based on the Wassermann reaction, the iodin test yielded about 70 per cent. false positive reactions with Wassermann negative serums.

4. The error of the iodin test, therefore, is not only in the low percentage of correct positive results, but is especially evident in the high percentage of false positive reactions with nonluetic serums.

5. With cerebrospinal fluids the iodin reagent produced no visible changes, irrespective of whether the fluids were from normal or luetic persons.

Free Public Laundries.—Buffalo claims to be the first city in the United States to establish free public baths and free public laundries. They are considered among Buffalo's best investments. The first free municipal bath house and laundry was opened January 2, 1897, in a tenement and cheap lodging house district. The second was opened in a similar neighborhood January 2, 1901. Both were popular from the start. According to the Buffalo *Sanitary Bulletin*, in 1915 the number of bathers was 151,111 men, 14,154 women and 53,461 children, a total of 218,714. The laundry was used by 7,698 men and 178 women, a total of 7,876. Two other municipal baths and laundries are to be established in the Black Rock and South Side districts.

THE WASSERMANN REACTION AS A CLINICAL TEST, WITH SPECIAL REFERENCE TO ITS BEARING ON MATRIMONY

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I

In concluding a recent article, Dr. E. L. Keyes, Jr.,[1] states that, "a negative Wassermann is not sufficient evidence of the cure or absence of syphilis," and that "a positive Wassermann, unsupported by clinical evidence, is not sufficient evidence of syphilis." He further remarks that "a positive Wassermann does not prohibit matrimony." With the first two statements it is impossible to disagree, although, by further study it may be shown that they are not axiomatic, and that they may be clarified in such a manner as to bring order out of apparent chaos. With the third statement cited above it is impossible to agree. The object of this article is to indicate that with the very facts from which these conclusions were drawn, other deductions might have been reached.

To dogmatize to the extent of asserting that the positive Wassermann, *per se*, indicates syphilis, is admittedly not wise, for diseases other than syphilis may give the reaction. These are yaws, lepra, tuberculosis, cancer, malaria and scarlet fever. If they are capable of causing the reaction, it goes without saying that others may do so too. We know of none, it is true, and hence, any discussion of such a possibility, however admissible, comes within the realm of medieval scholasticism. Of the diseases enumerated, yaws is at least closely related to syphilis, and the others frequently occur in syphilitics. In fact, from what we know of epithelioma of the tongue, and reasoning by analogy, it is conceivable that the Wassermann reaction is positive mostly in such carcinomas as originate in syphilitic cicatrices. Let us admit, however, that the reaction may be positive in patients suffering with the enumerated ailments, and in whom syphilis may be certainly excluded, if such a thing is possible, and what then? The Wassermann test in practice is a diagnostic and perhaps therapeutic aid to the clinician. Were there no other means to recognize non-syphilitic conditions able to produce this phenomenon, the test would indeed be worthless. All of them, fortunately, possess characteristic clinical, bacteriologic or histologic features which place their diagnosis beyond peradventure. Such being the case, it inevitably follows that a positive Wassermann in a disease obviously neither yaws, tuberculosis, lepra, carcinoma, malaria nor scarlatina, indicates the presence of syphilis.

There are other facts, however, which are more disconcerting because of their elusiveness, namely, the influence on the Wassermann reaction of various chemicals introduced into the body from without or engendered within the body by metabolic activity. Alcohol is known to render a positive Wassermann negative. Acidosis (Keyes) may excite its transitory appearance in individuals in whom it should be absent. In view of these phenomena and without theorizing about them, it is only rational for us as practitioners to study and classify them, lest they lead to misinter-

1. Keyes, E. L., Jr.: Some Clinical Features of the Wassermann Reaction, THE JOURNAL A. M. A., March 6, 1915, p. 804.

pretations. It becomes necessary to exclude them in given instances in which their presence would vitiate a valuable diagnostic aid.

The avoidable discrepancies in connection with the test are due either to faulty technic or inadequate knowledge of the application of results by clinicians. These are purely intellectual matters, however, involving the personal equation and insufficient familiarity with the intricacies of syphilis. The unavoidable discrepancies have a deeper meaning. It is now known that in competent hands more than nine-tenths of the results of the test correspond, regardless of the modification used. In the remainder the want of uniformity has hitherto baffled explanation. A committee of reliable serologists from several large institutions has been formed in New York with the object of endeavoring to discover the nature of and eventually, to find means of preventing these variations. The differences in technic are as follows: in the type of antigen used, in the titration of complement, in the nature of the hemolytic system, and in the method of incubation. A detailed analysis of these points would be of interest to technicians only and may be dispensed with here. When there is a disagreement in reading the results in this very small margin in which variations occur, it can be only in one respect. One individual finds the result positive, the other finds it negative. The former asserts that his method is the more sensitive, the latter inveighs against it as being too delicate. For the sake of uniformity it would be desirable to ascertain which method yields the maximum number of positive results in known syphilitics and negative results in presumable non-syphilitics. This method should be universally adopted, lest the number of serologic sects multiply infinitely and bring the test into disrepute.

The conditions in active syphilis in which the Wassermann reaction does or may remain negative are in the first incubation period prior to the appearance of the initial lesion, early in the second incubation period, during times of latency whether spontaneous or induced by therapy, in the tertiary stage, although other manifestations of the disease are present, in malignant syphilis, and in central nervous syphilis. The consensus of opinion appears to be that during the florid secondary stage the test is always positive, that during periods of clinical latency it is somewhat less likely to be present and can usually be provoked, if absent, and that during the tertiary period it is unlikely to be wanting. When absent in malignant syphilis, it at once explains the nature of this form of the disease and renders the prognosis grave. In central nervous lues, though at times it may not be found in the blood, it is usually to be ascertained in the cerebrospinal fluid together with the other phases of Nonne. Admittedly, then, the reaction may be negative in active syphilis, but this implies no inconsistency either in the malady or the test. Rather it places on the syphilographer additional burdens of correctly interpreting a lacking cardinal feature of the disease.

The positive Wassermann in non-syphilitic conditions has already been partly discussed in the second and third paragraphs of this paper. Foreign substances in the body and illnesses capable of producing this confusion are few in number, and easy to recognize for the alert observer. It is a question, too, whether patients afflicted with yaws, lepra, tuberculosis or cancer would wish to marry. In the few instances in which adults acquire scarlatina, it is likely that a wedding would be postponed to beyond the time of convalescence, so that even though the Wassermann reaction may arise in these illnesses, it has no bearing on matrimony. This leaves an enormous balance of positive reactions open to no other explanation than that they indicate syphilis, in fact, active syphilis and, as will be shown, syphilis capable of transmission. During the past five and a half years, at a conservative estimate, well over ten thousand tests have been performed at the German Hospital according to Wassermann's present technic, and I know of no instances which would tend to shake my faith in the above statement.

The Wassermann reaction, then, is an important diagnostic feature in syphilis when positive, and when negative it is an indication either of latency, of efficacious therapy or of cure, when properly considered. This postulate is advanced, subject to the following qualifications: first, that the test has been accurately performed, second, that all other conditions have been excluded capable of giving the reaction or of fortuitously rendering a positive test negative, or the reverse. From this it becomes plain that the test, when present, is but one symptom of the disease and is to be regarded as neither more nor less. It is perhaps the subtlest of symptoms, in that it may precede the appearance of clinical manifestations, and not fade until long after these have vanished.

II

To assent to matrimony merely because a syphilitic suspect has a negative Wassermann, would be a social and scientific dereliction. The phases of active lues during which the test may be negative have been mentioned. When a patient has been adequately treated, and without further treatment has had neither clinical evidence of the disease nor a positive Wassermann during a period of time conventionally assumed to be a year, and when all this has been verified by a provocative treatment, the test remaining negative, it seems reasonable to assume a cure. At least it seems more reasonable than to state that after five years, if a patient has no evidence of lues but a Wassermann reaction, he may safely marry. We are all familiar with the results of too early marriage among luetics. In former days these were due to excessive optimism based on absence of clinical manifestations; in recent days, in specious confidence in the negative Wassermann, misunderstood and misapplied. Conversely, we have all been astonished at times at the apparent harmlessness of active lues when the syphilitic's mate and offspring have both remained free from the consequences of daring. It is one thing, however, to have a fortunate deliverance from disaster and another to court disaster because of a few exceptional escapes. It would not be safe for an individual with tabes, cutaneous gummata or syphilitic cirrhosis of the liver to marry, and a positive Wassermann has precisely the same significance.

The tragedies resulting from such marriages are not merely those of infecting a hitherto sound person, or of having diseased issue. At any time a syphilitic may develop central nerve lesions, aortic insufficiency or an aneurysm, and thus become a burden to his family. However small the proportion of these unhappy eventualities, their possibility is always very real. These sequelae frequently incapacitate the patient and his dependents for effective work, and any or all of

those involved may, and often do, become ineffective social units and hence a burden on the community. Thus the risks involved are far greater than merely those of the transmission of disease.

Experimental and other evidence, too, condemn the belief that a luetic may justly marry even when the only trace of the disease is in a positive Wassermann reaction. In an article by Frühwald[2] on the infectiousness of the blood in latent acquired syphilis, the following citations from the literature are convincing. Uhlenhuth and Mulzer infected rabbits with the milk of latent syphilitic women whose only symptoms of syphilis was a positive Wassermann. Artzt and Kerl transmitted syphilis to rabbits by injecting milk from an eight-months gravida who had had syphilis five years before and at the time of the experiment had no evidence of the disease but a positive Wassermann reaction. Frühwald, himself, successfully inoculated rabbits in numerous instances with the blood of latent syphilitics. His ninth case was that of a woman with a five and a half years' history, whose Wassermann was positive. The inoculation was successful. The same was true in a case of three and a quarter years' duration in a young man. In other more recent infections, some of the inoculations were successful and others not. Of Uhlenhuth and Mulzer's fifteen cases, two furnished successful inoculations in the latent stage of syphilis four years old. One of these patients was a woman, the other a young man. Liebermann had a similar result in a case of similar duration, and Graetz failed in six cases. The latter[3] cites the history of a woman whose husband had been infected eleven years before their marriage and who had been pronounced clinically cured for years. She acquired lues within a year after her wedding. Including with Frühwald's cases those of the other investigators mentioned, about thirty-five attempts have been made to infect rabbits with the blood of latent syphilitics with the positive Wassermann reaction. In five instances this was successful, a large number considering the probable technical imperfections in so new an experimental field. These facts, together with the social and economic questions alluded to, should suffice to restrain us from regarding the positive Wassermann too leniently.

CONCLUSIONS

1. The Wassermann is negative at times in active syphilis, but only under definite and characteristic circumstances, and when this is understood, no confusion should arise.

2. The Wassermann test may be positive in the absence of syphilis, in certain other diseases, and under certain conditions easy to recognize and exclude.

3. With these exceptions the positive Wassermann indicates active lues.

4. Clinical and experimental corroboration of this point of view exists, and thus assent to matrimony should be withheld from individuals with a positive Wassermann test.

108 West Eighty-Seventh Street.

2. Frühwald: Dermat. Wchnschr., 1914, lix, No. 48, p. 1319.
3. Graetz: Dermat. Wchnschr., 1914, lviii, No. 11, p. 310.

Time of First Nursing.—It is quite indifferent whether or not a baby is put to the breast during the first or second twenty-four hours. The amount of milk in the breasts during this early period is as a rule so small that it need scarcely be considered from a nutritional point.—Isaac Abt, *Detroit Med. Jour.*, February, 1915.

FURTHER STUDIES ON THE SPINAL FLUID WITH REFERENCE TO THE INVOLVEMENT OF THE NERVOUS SYSTEM IN EARLY SYPHILIS

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During the past two years we have been investigating the spinal fluid of all our syphilitic patients and coincidently subjecting these patients to routine neurologic, ophthalmologic and otologic examination in order to determine, if possible, the frequency with which the cerebrospinal axis is attacked in early syphilis. The main object of this investigation was, if possible, to correlate the incidence of early central nervous system syphilis with the later sequelae in the nervous system, particularly tabes and general paresis. Our first publication on this subjcet, which was read before the American Dermatological Association last year,[1] included a study of thirty-six cases. In a more recent publication[2] we corroborated the finding of Wechselmann and others with regard to the incidence of central nervous involvement in the so-called preroseolar period, that is to say, in cases in which the chancre alone was present and before the hematogenous spread of the infection had occurred. Our first studies with reference to the early syphilis of the nervous system have now been supplemented with twenty-six new cases, making a total of sixty-two in all. In our later investigation we have uncovered some interesting facts and our methods of investigation have undergone some slight change.

Since the appearance of our first article, a few other investigations have been brought to light on this subject, notably one by Hauptmann.[3] This author discusses the cerebrospinal fluid in the diagnosis of early syphilitic meningitis. In the main, our results coincide in most respects with those of other investigators, notably Ravaut,[4] Dreyfus,[5] Wechselmann[6] and Hauptmann.

MATERIAL AND METHODS

The methods employed in this investigation have already been detailed,[1] and were again given in connection with our study of cerebrospinal involvement in the primary stage of the disease.[2] The routine use of the Nonne-Apelt technic in the estimation of soluble proteins in the spinal fluid, in addition to the simple boiling test, and the carrying out of complete nerurologic examinations in our cases through the courtesy of Professor Camp, constitute the principal additions to our methods of approaching the problem. We wish also to acknowledge, at this point, the courtesy of Professors Walter R. Parker and R. Bishop

1. Wile and Stokes: Jour. Cutan. Dis., September, 1914.
2. Wile, Udo J., and Stokes, J. H.: THE JOURNAL A. M. A., March 20, 1915, p. 979.
3. Hauptmann: Deutsch. Ztschr. f. Nervenheilk., 1914, li, 314.
4. Ravaut: Ann. de dermat. et de syph., 1903, 4th series, No. 2, pp. 1 and 537; ibid., 1904, 4th series, No. 5, p. 1507; ibid., 1907, 4th series, No. 8, p. 81; Rev. mens. de méd. inst., 1909, No. 3, p. 1.
5. Altman and Dreyfus: München. med. Wchnschr., 1913, v,465. Dreyfus: Ibid., 1912, lix, 2567.
6. Wechselmann: Deutsch. med. Wchnschr., 1912, No. 31, p. 1446.

Canfield,[7] on whose respective services the examinations of the fundus oculi and the acoustic apparatus were carried out.

STUDY OF DATA

Broadly considered from the point of view of all the methods used by us to arrive at the condition of the nervous system, only one of the twenty-six cases in the series was frankly negative, and in this case the eighth nerve was not investigated. Two other patients presented, respectively, exaggerated knee and Achilles tendon reflexes, and slight decrease in bone conduction with normal hearing. The remaining twenty-three cases were positive on two or more particulars of the examination. On the spinal fluid alone, nineteen of the twenty-six cases showed some positive finding—a percentage of involvement, judged by this criterion, of 73 per cent. This accords very fairly with the finding of 66.7 per cent. recorded in our previous paper. It should be recalled, and we have taken occasion to emphasize this point in previous discussions, that a negative fluid at the time of puncture does not necessarily imply that such a cerebrospinal fluid will not in the future show signs of meningeal reaction, or that it has not done so at some previous time. Nor should it be forgotten that definite involvement of the central nervous system may exist without the conventional signs in the spinal fluid, and that the percentage of cases in which the nervous system is actively implicated in the disease process is undoubtedly larger than that demonstrable by lumbar puncture. We feel it proper, therefore, to lay stress on the importance of the fundus and eighth nerve examinations as well as the complete neurologic examination in determining accurately the participation of the nervous system in the pathologic picture of early syphilis.

EXAMINATION OF THE FUNDUS OCULI

From the point of view of central nervous system involvement, we have accepted the presence or absence of neuroretinitis in the fundus examination as the significant feature. Such findings as choroidal changes, arteriosclerotic changes, perivasculitis, etc., have been rated as incidental to the syphilis but not to the central nervous system involvement.

Of the twenty-six cases in the present group, twenty-one were subjected to ophthalmoscopic examination. Of these, twelve patients showed a neuroretinitis and nine did not. Of the twelve positives, five were low-grade, three moderate and four severe.

Of the twelve in which neuroretinitis was present, ten were positive in the cerebrospinal fluid and two negative.

Of the nine cases showing no neuroretinitis, five were positive in the fluid and four were negative.

Other neurologic findings accompanied the neuroretinitis in four cases, with spinal fluid involvement, and such findings were present in the absence of neuroretinitis in four cases.

From these data it would seem reasonable to conclude that the involvement of the central nervous system may take place unaccompanied by demonstrable changes in the spinal fluid. On the other hand, neuroretinitis is by no means an invariable accompaniment of changes in the cerebrospinal fluid. In fact several of the cases in our present series in which the cerebrospinal fluid involvement was most marked, showed no changes in the nerve head. The severity of the neuroretinitis and the degree of meningeal involvement showed no definite relation to each other, in cases in which both were present.

EXAMINATION OF THE EIGHTH NERVE

Special significance was attached in these cases to decreased bone conduction in the presence of otherwise normal hearing. Changes in high and low limits of sound perception were also noted. Examination was made in sixteen cases, of which eleven were positive and five negative, or a percentage of 62.5 positives. This yields a slightly higher percentage of positives than second nerve involvement (57 per cent.) but the difference is scarcely significant. Of the eleven positive cases, eight presented positive findings in the spinal fluid and three were negative. Here, again, syphilitic involvement of a peripheral cranial nerve had taken place without any signs of meningeal reaction in three cases. Of the five cases in which the eighth nerve was normal, three were positive in the fluid and two negative.

Comparing eighth nerve involvement with that of the second nerve and other forms of central nervous involvement as revealed by general neurologic examination, we find that the test of the bone conduction is the most sensitive indicator of the condition of the nervous system at this stage of syphilis.

NEUROLOGIC EXAMINATION

Of twenty-two cases subjected to a complete neurologic examination, nine were positive in some particular and thirteen were negative. Of the nine positives, eight showed definite involvement of the spinal fluid, a significantly high percentage, which establishes the importance of a neurologic examination in all cases of early syphilis. On the other hand, the fact that a negative examination is not by any means synonymous with a normal nervous system is borne out by the fact that of the thirteen negative cases, nine had definite evidence of meningeal reaction in the spinal fluid.

A conspicuous example of positive neurologic findings with a normal spinal fluid will be specially mentioned below.

The following abnormalities were noted in the general neurologic examination: The knee and Achilles tendon reflexes were increased in six cases, diminished in one, lost in one. Pupils were sluggish in one, Argyll Robertson in one, and unequal in two. There was ptosis in one case, tremor in one, Romberg a doubtful positive in one and the gait was affected in one.

Passing from considerations dealing directly with the condition of the nervous system in early syphilis, the following additional data were compiled from the tables, dealing largely with the relation of central nervous involvement to such aspects of the disease as the general health, symptoms indicative of nervous involvement, the eruptive phenomena, influence of sex, and other general or systemic changes.

INFLUENCE OF SEX

Of the series here presented, ten were women and sixteen men. Using the spinal fluid as a criterion because of its definiteness, 80 per cent. of the women showed cerebrospinal involvement as compared with 68.6 per cent. of the men. This difference is sufficiently marked to be confirmatory of the views of

7. Canfield, R. Bishop: Jour. Mich. State Med. Soc., 1914, xiii, 389.

V. 191

Fournier as to the relatively greater frequency of early central nervous involvement in women.

ERUPTIVE MANIFESTATIONS

In our previous paper we were able to bear out the observation of Ravaut relative to the higher percentage of cerebrospinal involvement in patients presenting eruptions of the indurated papular and follicular types. Since no one type of eruption existed alone in any one patient, the estimates given below are based on proportions rather than on actual cases. Patients in whom roseola was the prominent feature of the efflorescence showed positive fluid involvement in 55 per cent. of the cases. Cases in which papular eruptions were predominant were positive in the fluid in 66 per cent. of the cases. Severe alopecia showed positive involvement in 85 per cent., follicular and pustular syphilids in 100 per cent., pigmentary syphilids in 80 per cent. Recurrent eruptions were positive in the nervous system in 85 per cent. in our series. The high proportions of involvement in the follicular, pustular and pigmentary syphilids is apparent without further comment.

GENERAL HEALTH

The criteria adopted in estimating the condition of the general health in the patients studied were detailed in our previous paper, and are here quoted directly.

> Under the heading "general health," an attempt was made to align the constitutional disturbance attributable to the infection into a terse estimate for comparative purposes. Slight anemia, with a loss of from 2 to 5 pounds in weight and mild asthenia which did not incapacitate the patient for work, with occasional nocturnal osteocopic pains, cephalalgias and myalgias, was rated as a "slight" effect on the general health. A "moderate" effect was regarded as including a blood picture of 3,500,000 to 4,000,000 red cells, a hemoglobin of 70 per cent., a sharp drop of from 5 to 15 pounds in weight, malaise with partial incapacity, anorexia, slight fever and pronounced symptoms of bone involvement. Our severe cases showed marked incapacitating asthenia and prostration, losses in weight varying from 15 to 40 pounds or more (syphilitic cachexia), symptoms of meningismus, hydrarthrosis and pronounced anemias. The individual habitus of the patients is of course allowed for, and we realize that such a classification involves a large subjective element.

Summarized in this way, moderate or severe involvement of the general health was found in twelve cases, of which ten were positive in the spinal fluid and only two negative. Of the cases showing slight impairment of the general health or none at all, eight were positive in the fluid and four negative. It is evident, therefore, that in this series as well as in our first publication, there is an appreciable correlation between severe impairment of the general health and positive findings in the cerebrospinal fluid. It is of interest to note that severe loss in weight with only a single exception, was accompanied by involvement of the cerebrospinal fluid. The losses ranged from 10 to 50 pounds.

SUBJECTIVE SYMPTOMS

In general, patients with negative fluids were free from subjective symptoms of any description. On the other hand, a number of the positive fluids occurred in patients who complained of no subjective symptoms whatever. In our previous series, severe headache, insomnia and increased nervous irritability seemed to preponderate in cases showing positive cerebrospinal involvement. In the present series such a relation was only definitely apparent in the case of headache, presented by seven patients, either preceding or at the time of entry. Of this number, six were positive in the fluid and only one negative. One patient with positive fluid complained of dizziness and buzzing in the ears. An increased cell count, with headache, was present in four of the six cases. Headache was not associated with pleocytosis in one case and one case with violent headaches had a perfectly normal fluid. Again, five other cases with pleocytosis, in one case as high as 194 cells, showed absolutely no headache. From these observations it may be concluded that of all the subjective symptoms, severe headache is most often associated with cerebrospinal reaction, though not necessarily with pleocytosis.

REACTION TO PUNCTURE

Following lumbar puncture patients were put to bed without a pillow, with the foot of the bed elevated about 10 inches, and were kept quiet for twenty-four hours, or longer if they experienced symptoms on arising. In spite of these precautions a number of patients developed reactions of varying severity, marked by headache, occasional dizziness and, in a few cases, vomiting and rises of temperature. Comparison of reactions in patients with normal and with abnormal fluids, failed to show that the tendency to reaction was any greater in the one than in the other. This is contrary to the observation of Dreyfus, that reaction to puncture occurs more frequently in normal cases.

EFFECT OF TREATMENT RECEIVED PRIOR TO ENTRY

Only two patients in this series had received anything even approaching efficient treatment before entering the hospital. One of these had received two injections of salvarsan and a negligible amount of mercury. His was the only entirely negative case in the series. The other had received thirty-two injections of a mercurial salt. This patient presented a positive second and eighth nerve involvement, increased albumin in the spinal fluid, Wassermann positive on the blood and negative on the fluid. The remaining patients had received either desultory pill treatment or none at all. The figures scarcely justify comparisons on the effect of treatment in preventing early involvement, but they are at least suggestive.

It seems desirable at this point to introduce brief summaries of certain special cases which have come under our observation, illustrating phases of early central nervous system involvement in syphilis. Two cases of seventh nerve paralysis of the Bell type in association with secondary syphilis have been seen in this clinic and are here made the subjects of a brief report.

Since the data on the foregoing series were prepared, a case of florid secondary syphilis came under observation which illustrates so admirably the fact that severe involvement of the nervous system may take place with almost negligible changes in the spinal fluid, that it was deemed advisable to append a report.

REPORT OF CASES

CASE 1.—S. C., a man, aged 24, a clerk, with a negative family history, and practically negative past history, six months prior to coming under observation, developed a primary lesion on the shaft of the penis with typical satellite adenopathy. He was placed on treatment early in the disease and never developed a frank secondary eruption. Three months before entry he received a single injection of old

salvarsan and a course of pills. In spite of this treatment, however, he lost much weight and has had considerable ringing in the ears with headache and backache. Lumbar puncture four days previous to admission showed a positive Wassermann on the spinal fluid. The Wassermann reaction was also positive on the blood at this time.

Examination disclosed a poorly nourished man with a few mucous-membrane lesions and a periosteal node on the sternum. The patient was salivated on entry and exhibited a slight general adenopathy. On the third day after entering the hospital he received 0.3 gm. of neosalvarsan intravenously by the method of Ravaut. He complained of severe headache, possibly the result of his previous puncture. Epiphora and injection of the conjunctiva of the left eye were noted at this time. Three days after the initial injection of salvarsan, lumbar puncture was done, the Wassermann on the fluid being four plus. There was also a definite increase in albumin but a cell count was impossible on account of blood contamination. Twenty-four hours after the puncture, the patient suddenly complained that he was unable to close the left eye entirely and that his mouth was drawn to one side when he tried to talk. On examination, no change in the ocular or pupillary movements and reflexes could be discovered, but the left eyelid would not close more than half way and the mouth was markedly drawn to the right on talking or smiling. The patient was at once referred to Professor Camp for neurologic examination. The report is as follows:

"Patient cannot wrinkle left side of the forehead. He can close left eye with effort. Tongue protrudes straight. Says he hears better in left ear. Can hear a watch tick in contact with his right ear, 2 inches from left ear (normal 3 feet). Pupils react to light, the right a little better than left. Extra-ocular movements normal. No paralysis of soft palate, no paralysis of masseters. No anesthesias. Biceps, triceps, knee and Achilles reflexes equal and normal. There is slight dizziness. Gait is normal with eyes open, slightly staggering with eyes closed. No ataxia. 'Sour' is not tasted in the anterior two-thirds of the tongue on either side but is tasted in the mouth. 'Sweet' is not tasted on the left, is tasted right anteriorly. Left peripheral facial palsy, involvement in Fallopian canal."

This case was also discussed by R. Bishop Canfield[1] from the point of view of combined auditory and seventh nerve involvement. In view of the obvious involvement of the central nervous system, injections of mercury salicylate were inaugurated in conjunction with the salvarsan. On the fifth day following the appearance of the palsy, a second injection of neosalvarsan, 0.3 gm., was given intravenously without reaction. On the seventh day the palsy showed the first sign of clearing up. A third injection of salvarsan was given on the tenth day and from this time on the patient showed a rapid improvement. On the twelfth day the patient's smile was again fairly symmetrical and he was able to whistle distinctly. On the seventeenth day following a fourth injection of neosalvarsan, dose 0.8 gm, it was noted that the palsy had practically cleared up. The patient was then discharged from the hospital and placed on a vigorous course of mercurial inunctions. He was kept under observation for a considerable period of time and showed no signs of relapse. He finally left the care of the clinic and went West. During this time he was placed on weaker inunctions than those originally prescribed for him. The clinic was presently notified of the fact that he had suffered a relapse which, from his description, consisted of a complete ptosis of the left upper eyelid. This apparently cleared up under treatment and the patient is at present Wassermann negative in the blood and in excellent general health. He has received in all five injections of neosalvarsan and two courses of mercury salicylate injections, in addition to a course of forty inunctions.

The feature of special interest in this case, of course, is the unusual occurrence of seventh nerve involvement in the canal. This we feel may properly be regarded as a "neuro-recidive," peculiar only in the particular nerve affected. Although the palsy was apparently of the Bell type, none of the other explanations for such a condition were applicable in this case, and the prompt response to continued antileutic treatment seems to establish the specific nature of the condition.

Case 2.—L. W., a man, aged 27, with negative family history, acquired syphilis from his wife who was under treatment in this clinic at the same time. The primary lesion was first noticed two months before entry, with a typical satellite adenopathy. A month and a half after the first appearance of this primary lesion the patient woke up one morning to find that the left side of his face was apparently paralyzed and that the left eye would not close. At this time no signs of a secondary eruption had appeared. Fully a month after the onset of the palsy the patient developed a papular and papulopustular syphilid with mucous-membrane involvement and a slight adenopathy. The general health on the whole was little affected. Electric treatment applied by his family physician did not affect the palsy in the least. At the time of entry, the patient presented the typical picture of complete seventh-nerve paralysis on the left side. The eruptive phenomena consisted of a maculopapular rash with a few pustules and grouped follicular lesions over the thighs. Lumbar punctures, done immediately after entry, showed a spinal fluid containing twenty-four cells to the cubic millimeter and a two plus increase in albumin. The spinal fluid Wassermann was positive. Salvarsan injections were at once inaugurated, the initial dose being 0.3 gm. and the interval between injections four days. Four injections were given, the last two being full doses. The cutaneous manifestations disappeared entirely under this treatment with very little change in the facial palsy. The patient noticed some relief from the signs of irritation in the left eye and he could apparently close the lid somewhat further than when he came under observation. Examination of the fundus failed to show any signs of neuroretinitis. Examination of the acoustic complex demonstrated a moderate internal-ear deafness, more marked on the left side. Professor Camp's report is the following:

"Your patient, Mr. W., shows a facial palsy on the left side, of the peripheral type, involving the distribution of all three branches of the nerve. Bell's phenomenon was present. There is lost sense of taste in the anterior two-thirds of the tongue on the left side. There is complete reaction of degeneration in the muscles of the left side of the face. Aside from the facial palsy and its associated phenomena, the neurologic findings were practically negative. The tendon reflexes are prompt in the lower extremities. There are no sensory changes anywhere except anesthesia of both conjunctivae and the pharynx, probably hysterical in type. My diagnosis is facial palsy due to a destructive lesion in the facial nerve in the Fallopian canal."

The patient was discharged from the hospital following his fourth injection of salvarsan and has not been under observation since. His wife presented practically no neurologic manifestations.

Had this case been under observation from the onset of the disease, we should have included it in our group of cases previously reported, illustrating involvement of the central nervous system in association with primary syphilis. It seems reasonable to conclude from the absolute failure of this case to respond to treatment, that the nerve had sustained much more serious damage than could be explained by the transient edema of a "neuro-recidive." The correlation of the seventh-nerve findings with well marked changes in the spinal fluid seems to justify our placing this case among the definitely syphilitic types of involvement of the central nervous system in secondary syphilis.

Passing now from specific involvement of the seventh nerve to a group of cases illustrative of more

V. 191

general involvement of the central nervous system in secondary syphilis, the following case presents the typical picture of meningeal involvement repeatedly observed in this clinic.

CASE 3.—P. S., a man, aged 19, with negative family and past history. Two months prior to entry a typical primary lesion developed on the penis. This disappeared within a few days and was followed in about four weeks by the development of furuncle-like lesions on the scalp, face and trunk. The patient began to lose weight rapidly and suffered from violent headache. When the eruption reached its fullest development the headache became less severe and stiffness of the neck gradually set in. There were osteocopic and arthralgic pains and severe involvement of the mucous membranes.

On examination the patient was found to be decidedly undernourished and anemic. The head was carried in a peculiar rigid posture, a little tilted backwards. When the patient was requested to bend the head forward, he would bend from the waist. By putting his hands behind his head, he was able to bend it forward half the normal distance. The skin manifestations were exclusively of the large pustular type and presented the typical picture of the varioliform syphilid. A few of the larger lesions approached the rupial type. Involvement of the pharynx and buccal mucosa was unusually extensive. Adenopathy small and shotty in type. Lumbar puncture done on entry gave the following findings: Albumin two plus; cells 720; Nonne-Apelt plus-minus; Wassermann three plus. The patient suffered no reaction and was at once placed on vigorous treatment with salvarsan, the initial injection being 0.3 gm. of old salvarsan. Four injections of 0.3, 0.45, 0.6 and 0.5 neosalvarsan, respectively, produced a remarkable change in the patient's condition. The rigidity of the neck muscles rapidly disappeared. The patient made a marked gain in weight and showed a decided rise in hemoglobin. Examination of the fundus showed neuroretinitis. Bone conduction was definitely decreased in the eighth-nerve examination, and apart from the signs of meningismus and increased knee jerks, the neurologic examination was negative.

This case is of special interest on account of the very severe meningismus in association with very early second and eighth-nerve involvement. Together with this, the spinal fluid changes showed striking positive findings throughout.

CASE 4.—E. C., a woman, aged 26, with negative family history. Seven months prior to entry the patient developed what from her description was a tonsillar chancre. Five months after surgical removal the first cutaneous secondaries appeared and with their onset the patient began to notice a very definite improvement in her general health. It is of especial interest in this case to note that a patient suffering previously from gastric and visceral neuroses underwent, with a generalization of her infection, a striking improvement in general health. That this was not exclusively subjective is shown by a recorded gain of 15 pounds in weight during the five months preceding her entry. She had formerly been much troubled with headaches which apparently disappeared when her syphilis reached an active stage.

Examination disclosed a well-nourished, well-developed young woman. The cutaneous manifestations were of the maculopapular type with a very striking leukoderma colli and marked syphilitic alopecia. The mucous membranes of the mouth and vagina were also affected. Adenopathy was marked. Lumbar puncture done after the first injection of salvarsan showed a pleocytosis of 260, Nonne-Apelt positive, one to nine, and a strongly positive Wassermann. The Wassermann on the blood was also positive. There was a marked reaction to puncture. Three injections of old salvarsan were administered with excellent effect on the cutaneous manifestations. Following the first injection, she showed a marked delayed Herxheimer reaction. Examination of the fundus showed a neurochorioretinitis. Neurologic examination was practically negative.

As was pointed out in the history, the special interest which attaches to this case is that of the remarkably good general health which may accompany severe involvement of the central nervous system, as evidenced by the spinal fluid findings. Cases of this type illustrate admirably the fact that objective changes in the cerebrospinal fluid may be unassociated with any subjective neurologic findings.

CASE 5.—C. F., man, aged 27. Family and past history negative except for slightly impaired hearing. Primary lesion two months prior to entry, secondary eruption of ten days' standing. Ringing in the ears for two weeks. Marked loss in weight and weakness. Profuse papulosquamous eruption combined with a grouped miliary follicular syphilid. Marked alopecia. Very large primary induration. Pronounced mucous-membrane involvement. Marked general adenopathy. Right pupil much larger than left, both very sluggish to light. Fundus examination showed a marked neuroretinitis, and the internal-ear deafness was so pronounced that the patient could scarcely hear the forks at all. Spinal puncture showed a negative Nonne-Apelt, seven cells per cubic millimeter and a plus-minus Wassermann reaction. After three injections of old salvarsan, preceded by intramuscular administration of mercury salicylate, the deafness underwent a marked improvement. Patient gained rapidly in weight and was discharged greatly improved.

Considerable interest attaches to this case on account of the very pronounced subjective and objective neurologic findings in a patient presenting a practically normal spinal fluid.

The second group of cases presented above, excluding the cases of seventh-nerve involvement, serve as admirable examples, on the whole, of the insidious onset of central nervous manifestations in secondary syphilis, and the ease with which they may be overlooked in any but systematic examination. While their importance in determining the prognosis of a case is as yet not fully established, there seems little reason to doubt that definite evidence of the determination of the infection to the nervous tissues must form an important element in prognosis. It therefore devolves on an examiner to leave no stone unturned to determine the extent of such an involvement. Lumbar puncture is a procedure within the reach of almost any physician who is called on to undertake the management of secondary syphilis. We feel that the emphasis which was placed on lumbar puncture as a diagnostic and prognostic procedure in our previous paper can profitably be reemphasized at this point. It should, however, be borne in mind that the lack of meningeal reaction does not necesarily preclude a serious involvement of the optic or auditory nerves and for this reason the examination of these structures should form a part of the expert management of a case of secondary syphilis.

It has been stated by some writers, notably by Fraenkel,[8] that involvement of the brain and cord in secondary syphilis could be ruled out if the Wassermann reaction in the spinal fluid is negative. It is obviously impossible to accept this statement in view of the frequency of very definite involvement, both subjectively and objectively, without an accompanying postive Wassermann reaction in the fluid.

The significance of a positive reaction in the fluid itself has been questioned by some authors, notably

8. Fraenkel: Ztschr. f. d. ges. Neurol. u Psychiat., 1912, No. 11, p. 1.

by Zaloziecki,[9] who brought forward the theory that the positive reaction in the fluid might easily be due to a filtration of complement-binding substances from the blood. Against this view is the fact that, as Plaut and Wassermann have shown, the reaction in the fluid is occasionally much stronger than it occurs in the blood itself and, moreover, it is a well-known fact that one not infrequently finds a reaction in the fluid alone, the blood remaining negative. The relative unimportance of the Wassermann reaction in the fluid is shown in Ravaut's[4] studies and in those included in this paper, in which perfectly definite central nervous involvement was present without complement-binding substances in the fluid.

Of greatest importance is the possible bearing that these early cases of central nervous syphilis have on the later sequelae. This subject has been discussed by Mathauschek and Pilcz.[10] These authors present statistics to show that in their series paresis and tabes occurred in cases which in their early stages were treated inefficiently or not at all. This confirms an observation made many years ago by Fournier. As expressed by us before, all cases of syphilis which reach the secondary stage, and indeed some of those in the preroseolar stage, receive from the primary focus a hematogenous infection which must of necessity reach the nervous system as well as other viscera. This being the case, how can one satisfactorily explain the occurrence of objective or subjective manifestations in the nervous system, or both, in certain cases, and perfect freedom of the nervous system in others? Two main theoretic considerations present themselves as explanatory. In the first, that in cases in which the nervous system is manifestly involved, one is dealing with a strain of spirochetes which has a special predilection for the nervous system. There is indeed a considerable amount of clinical as well as experimental evidence in favor of this view. The second theoretic consideration deals with the susceptibility of the individual to the organism, by reason of an already predisposed nervous system. That is to say, that in cases in which the involvement is manifest, the spirochete falls, as it were, on fertile soil. If this be so, then it might be proper to assume that tabes, paresis and arterial syphilis of the nervous system develop in those persons in whom the spirochete has early made its impress. *A priori*, it would seem that considerable weight must be given to both of these factors. Thus the person whose nervous system was already impaired or below par, in whom there was an infection with a strain of the spirochetes having a predilection for the nervous system, might be considered a likely subject for the later nervous sequelae. Much work in connection with the life history of the spirochete will be necessary before this subject can be fully elucidated.

The great frequency with which we have found definite changes in the cerebrospinal fluid without any manifest neurologic objective findings makes it seem highly probable that for the most part the involvement of the nervous system in early syphilis is of an ephemeral character. Under appropriate and vigorous treatment, the fluid soon resumes its normal appearance. The great frequency with which the second and eighth nerves as well as other neurologic disturbances can occur without any demonstrable change in the fluid shows clearly that such negative findings in the spinal fluid are only of value when careful neurologic examination has shown that there is no involvement of the cranial nerves. We believe that the fate of every syphilitic, with regard to the integrity of his nervous system, is determined in the first months of his infection, since it is then that the nervous system receives its quota of the spirochetes. At this time the lesions are of an ephemeral character, the manifestations for the most part slight and all seem readily amenable to treatment. Any case, therefore, which shows involvement of the central nervous system in the early months, whether this be manifested by the study of the spinal fluid or by objective neurologic findings, or both, should be considered potential as a tabetic or paretic, and should receive the most energetic treatment. Our studies have been of too short duration to determine whether such cases as these which have received vigorous treatment at our hands, have been protected against later sequelae. Their very prompt recovery, however, from objective and subjective symptoms, and the prompt return of the fluid to normal, leads one to hope that such a result has been attained.

The statement has been made that the later sequelae do not develop from such cases as those just mentioned, but that they develop for the most part in those in whom early involvement is not demonstrable. It is certainly a clinical fact that there is an inverse relation between the early severity of the infection and the appearance of late sequelae in the nervous system. For the most part, tabetics and paretics have had so-called mild early syphilis, indeed, in many cases so inconspicuous that the patients remained in total ignorance of the infection. It must be remembered in this connection that the largest number of our cases with definite involvement demonstrable, occurred in patients in whom a nervous system involvement was absolutely unsuspected and would have remained undiscovered, had not careful examination been made. It is not too sweeping an assertion to say that the majority of cases of early involvement of the nervous system are unaccompanied by subjective symptoms. These cases, therefore, might well be included in the so-called mild early attacks. It must be admitted also in this connection that in such cases, in which there have been definite nerve changes early, the nervous system may have been irreparably injured. Notwithstanding the facility with which such symptoms are caused to disappear, it might well be that the nervous system had sustained an injury from which it may never recover, in spite of the most vigorous treatment directed toward it. Here again careful studies of these cases over a number of years will determine the correctness of this view.

9. Zaloziecki: Berl. klin. Wchnschr., 1912, No. 36, p. 1717.
10. Mathauschek and Pilcz: Ztschr. f. d. ges. Neurol. u. Psychiat., No. 8, p. 133.

The Pellagra Situation in South Carolina.—The State Board of Health has been notified of the existence of 2,530 cases of pellagra in the state during 1913. It is believed that the actual number of cases is much greater, for only about 35 per cent. of the physicians of the state have made any returns on the subject. A marked feature of the distribution of the disease is the greater comparative frequency of cases in the coastal plain counties. There is a marked preponderance of cases among females according to the annual report of Dr. Thomas J. Strait, Lancaster, superintendent of the State Hospital for the Insane. Over 50 per cent. of the deaths in the institution are caused by pellagra.

THE INTRAVENOUS INJECTION OF MERCURIALIZED SERUM IN SYPHILIS

A PRELIMINARY REPORT

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On reading Byrnes'[1] article on the intradural injections of mercurialized serum, it occurred to me that the unpleasant results (phlebitis and periphlebitis), which occasionally occur on the intravenous injection of mercurial salts in watery solution, might be obviated by injecting mercurialized serum instead. This was tried with very gratifying results, and I have now made sixty-six injections in eight cases, and in no case has there been the slightest amount of phlebitis.

TECHNIC

The method of procedure is as follows: From 40 to 50 c.c. of blood are collected by venipuncture and placed in a large test tube which has been boiled in salt solution. It has been found that the serum separates from the clot much more rapidly and in considerably larger quantity if collected in a tube prepared in this manner than if collected in one sterilized by dry heat. After separation, the serum is poured off and thoroughly centrifugalized.

A solution of mercuric chlorid is prepared so that each cubic centimeter contains 22 mg. (⅓ grain) of the salt.

The serum is now measured and divided into two parts, one-third of the amount placed in one tube and the remainder in another. The mercury solution is added to the first part in the proportion of 1 c.c. to each 2 c.c. of serum. A heavy precipitate of albuminate of mercury appears which is completely dissolved on the addition of the remainder of the serum.

It will be seen that the mixture will contain 22 mg. (⅓ grain) of mercuric chlorid in each 7 c.c. At first I had great difficulty in keeping the albuminate of mercury in solution for any length of time, and prepared the solution fresh before each injection, but later discovered that if the mixture is heated in the water bath for one-half hour at 55 C. (131 F.) it will remain in solution indefinitely. It is not necessary to use autogenous serum. Blood may be collected from any individual, and the mercurialized serum prepared and kept in sealed ampules.

The injections are made into one of the veins at the elbow with an all glass syringe and a 25-gage needle. It is imperative that the needle be sharp.

A tourniquet is applied above the elbow until the veins stand out prominently. The field is sterilized with alcohol and the needle inserted in the direction of the blood stream, into the most prominent vein. A slight flow of blood into the syringe will indicate that the needle is within the lumen of the vein. The tourniquet is removed and the serum slowly injected. A drop of collodion is placed on the wound.

The initial dose in all cases was 1.75 c.c., or 5.5 mg. (1/12 grain) of mercury, and was increased to 7 c.c., or 22 mg. (⅓ grain).

Quite severe ptyalism occurred in one case after 131 mg. (1⅚ grains) had been administered.

Three of the other cases showed slight symptoms of ptyalism after 165 mg. (2⅔ grains) had been administered, and the injections were discontinued. The other four cases are still under treatment. In all cases there has been noted some improvement of the symptoms. Six of the eight cases are ulcerating gummas of the skin, while of the other two, one presented a circinate syphilid, the other a papulopustular syphilid. The latter case showed the most improvement, the lesions clearing up wonderfully after ten injections with a total of 165 mg. (2⅔ grains) of mercury.

After this amount had been administered the mercury was discontinued, owing to slight symptoms of ptyalism and other remedies given (potassium iodid and salvarsan).

CONCLUSIONS

1. A method for administering mercury intravenously without the occurrence of phlebitis and periphlebitis has been devised.

2. The intravenous method of administering mercury is not the method of choice in all cases of syphilis, but is so in certain cases in which quick results must be brought about, and in those cases in which great pain occurs on intramuscular injections of mercury.

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1. Byrnes, C. M.: The Intradural Administration of Mercurialized Serum in the Treatment of Cerebrospinal Syphilis, THE JOURNAL A. M. A., Dec. 19, 1914, p. 2182.

INVOLVEMENT OF THE EIGHTH NERVE IN SYPHILIS OF THE CENTRAL NERVOUS SYSTEM *

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The onset of sudden or rapidly progressing deafness in patients with syphilis is a not uncommon occurrence. It is usually considered to be due to a syphilitic lesion of the eighth nerve or of the labyrinth, and the prognosis for the regaining of hearing by the patient is considered unfavorable. It is the purpose of this communication to show that these affections should not be considered and treated as instances of isolated disease of the organ of hearing, but merely as manifestations of that extremely serious condition, syphilis of the central nervous system. Cases will also be reported which demonstrate how satisfactorily hearing may return, if the diagnosis is promptly made and thorough treatment instituted before irreparable damage to the nervous tissue has resulted.

The relative frequency of syphilis of the inner ear, especially early in the syphilitic infection, has been the subject of much discussion, especially during the past three years. This discussion has evidenced a wide diversity of opinion on the part of different observers. While many have held that syphilis of the inner ear, previous to the advent of salvarsan, occurred extremely rarely in the secondary period, others have asserted with equal assurance that when looked for it was quite commonly found, and have reported numerous cases bearing out their contention. Benario[1] has even been able to show in a series of cases collected from the literature that the acoustic nerve is more commonly involved in the early stages of syphilis than any of the

* From the Hospital of the Rockefeller Institute for Medical Research.

1. Benario, J.: Ueber Neurorezidive nach Salvarsan und nach Quecksilberbehandlung, München, 1911.

other cranial nerves, and this whether the patient has previously been treated with salvarsan or with mercury.

The most striking figures on the frequency of this condition are the series of cases observed by Habermann and by Mayer in the University Clinic in Graz, all of which were observed before the use of salvarsan. Habermann[2] in 1896 reported sixty-six cases of syphilis of the inner ear, of which thirty-four appeared during the secondary stage of the disease. Of these thirty-four cases, three appeared some days before the outbreak of the skin eruption, and in only six was the ear disease noticed later than ten weeks after the exanthem. Since Habermann reported these cases, Mayer[3] has seen in the same clinic sixty-five cases of acousticus paralysis, thirty of which occurred within the first year of the syphilitic infection, and 20 per cent. within from three to ten weeks of the appearance of the primary lesion.

Rigaud[4] in 581 patients with syphilis found sixty-one cases of early or late ear disease. The earliest reported onset of a lesion of the eighth nerve in syphilis is the case reported by Politzer[5] in which the symptoms occurred seven days after the appearance of the chancre. Rozier[6] also has reported two cases in which the ear disturbance occurred some days before the appearance of the cutaneous secondary lesions. All of the foregoing cases were observed before the advent of salvarsan.

The question of the frequency of syphilitic affections of the eighth nerve in the early stages of syphilis is intimately associated with the question of the etiology of the so-called "nerve relapses," the paralyses of cranial nerves occurring in patients with secondary syphilis who have been inefficiently treated with salvarsan. The findings in the spinal fluid in these cases —increased cells, excess globulin and usually a positive Wassermann reaction—have now definitely proved them syphilitic. The figures which are given above suggest that the great increase in frequency of such cases, which is claimed to have resulted from the use of salvarsan, has been exaggerated; but that the severity of these affections of the cranial nerves in early syphilis is rather markedly increased and somewhat more frequent in patients inefficiently treated with salvarsan seem to be indisputable facts.

Gennerich[7] has studied carefully this phenomenon of increased severity in the relapses following salvarsan. He has pointed out that they hold equally for relapses occurring in the skin as for those in the nervous system. He considers that this increased severity in patients insufficiently treated with salvarsan is due to the absence of the resistance to local expansion of the syphilitic process, which usually develops in syphilitic subjects coincident with the appearance of the secondary eruption. This is the process which leads to the spontaneous regression of the primary lesion in untreated cases of syphilis. The absence of this resistance to local expansion of the syphilitic process in patients treated with salvarsan he ascribes to the rapid elimination of the mass of the infecting treponemes. If the case has been inefficiently treated, a few organisms will, however, remain in some foci difficult to reach with the curative agent. Such foci are frequent in the nervous system. The development of organisms remaining in such a focus in a patient treated with salvarsan takes place, therefore, rapidly in the form of an intense local infiltrating lesion, simulating a primary lesion in its development. From these relapsing foci, if the patient has no further treatment, a fresh general infection of the body may again occur. Gennerich's explanation is a logical one and seems to account satisfactorily for the observed phenomena.

For many years an active discussion has been carried on concerning the exact portion of the auditory mechanism usually affected in syphilis. The majority of the earlier writers, notably Habermann[2] and Kreibich,[8] considered the lesion to be usually labyrinthine. Gradenigo[9] was the first to make any careful attempt at differential diagnosis. He considered that the symptoms were usually those of lesion of the nerve stem, rather than of the labyrinth. He, however, admits that "the clinical differentiation of nerve stem and labyrinthine disease is one of the most difficult tasks of the otologist." Rosenstein[10] considered that the lesions were only rarely labyrinthine. He collected five cases from the literature in which necropsy results were given. Of these five cases, two showed lesions of the nerve stem, one of the nuclei and roots, and one of the nerve roots alone. Nonne[11] has pointed out how frequently disturbances of the acoustic nerve are associated with lesions of the other cranial nerves. He also considers the ear disturbances to be due to an involvement of the nerve in a basal meningitis. In 1911 Knick and Zaloziecki[12] first called attention to the changes in the spinal fluid in cases of syphilitic disease of the acoustic nerve. They reported nine cases of lesions of the eighth nerve, all occurring in the early stages of syphilis. The spinal fluids in all these cases were markedly abnormal, the cell counts being 58, 115, 56, 109, 481, 1,517, 360, 148 and 18, respectively. The Nonne-Apelt reaction was positive in all. The Wassermann reaction in the spinal fluid from one case was not mentioned, but in the other eight it was positive. Such findings are accepted evidence of a syphilitic meningitis. They seem to prove that in the early cases, at least, the disturbances of the auditory mechanism are due to an involvement of the eighth nerve in the course of a syphilitic meningitis.

During the past four years we have seen seven such cases of syphilis of the meninges involving the eighth nerve.

REPORT OF CASES

CASE 1 (No. 187).—Man, aged 32, physician. Chancre of finger, May 24, 1911. Secondaries June 30.

Admitted, July 6. Status praesens: chancre of finger; general macular syphilid; pupils and fundi normal. Watch-tick heard on right at 40 cm., on left at 20 cm.; thickening of left ear drum from old otitis media. Reflexes all active.

July 20: Chancre and rash have disappeared.

September 7: Has had ringing in right ear, and slight vertigo.

September 9: Treatment of yesterday followed by slight febrile reaction. To-day slight dizziness and headache.

November 24: Vertigo which disappeared after last treatment reappeared to-day.

November 26: Nausea and roaring in right ear has become continuous.

2. Habermann, J.: Die luetischen Erkrankungen des Gehörorgans, Jena, 1896.
3. Mayer, O.: Wien. med. Wchnschr., 1911, xxiv, 381.
4. Rigaud, M.: Ann. de dermat. et de syph., 1912, iii, 720.
5. Politzer, A.: Lehrbuch der Ohrenheilkunde, Stuttgart, 1908.
6. Rozier, de Pau: Ann. d. mal. de l'oreille, 1905, xxxi, 1, 245.
7. Gennerich, W.: München. med. Wchnschr., 1913, lx, 2391.
8. Kreibich, C.: Med. Klin., 1907, iii, 1577.
9. Gradenigo, Giuseppe: Die Erkrankungen des Nerven acusticus, Arch. f. Ohrenh., 1889, xxvii, 105.
10. Rosenstein, Alfred: Arch. f. Ohrenh., 1905, lxv, 193.
11. Nonne, Max: Syphilis und Nervensystem, Berlin, 1909, p. 239.
12. Knick, A., and Zaloziecki, A.: Berl. klin. Wchnschr., 1912, xlix, 639.

December 3: Stiffness of neck.

December 4: Mercury injection, followed by slight improvement in symptoms.

December 8: Readmitted. Status praesens: right pupil slightly larger than left; double optic papillitis. Hearing: right, watch, 21 cm., whisper, 250 cm.; left, watch, 88 cm., whisper, more than 400 cm. Bone conduction markedly diminished on right with all forks. Weber to left; left labyrinth more irritable than right. Slight right facial paralysis. Reflexes normally active.

to left. Rinné positive in both ears. Diminished hearing in left ear is due to a chronic otitis media.

CASE 2 (No. 392).—Man, aged 34, journalist. April 22, 1911. Exposure. May 2, chancre. May 26, general macular syphilid, angina, general malaise. June 9, 16 and 24, each 0.5 gm. salvarsan. During July and August had 6 inunctions and 12 injections each of one-half grain of mercury salicylate.

August 19: Stiffness in muscles of face, lanceolating pain in occipital region; dizziness and headache, followed in one week by complete deafness in left ear.

TABLE 1.—TREATMENT AND REACTIONS IN CASE 1*

Date	Blood, Wassermann Reaction	Cerebrospinal Fluid			Treatment	
		Cells	Noguchi Globulin	Wassermann Reaction	Salvarsan	Mercury
1911—						
July 7	++	....	....	.....	0.5 gm.	
August 20	+	....	....	.....	0.2 gm.	
September 8	—	....	....	.....	0.4 gm.	
August 10 to October 24	....	....	....	.....	.....	9 inject. Hg salic.
December 8	—	575	++	1.0 c.c. ±	0.4 gm.	
December 15	—	....	....	.....	0.2 gm.	
December 15 to Nov. 9, 1912	....					
1912—		....	....	.....	.....	25 inject. Hg salic.
November 9	—	....	....	.....	0.6 gm. neo.	
November 23	—	10	—	1.0 c.c. —		
November 24 to December 5	....	....	....	.....	3×0.9 gm. neo.	
1913—February 6	—	Refused further treatment.				
Total					9 injections: 1.7 gm. salv. 3.5 gm. neo.	34 injections

* Complete fixation is indicated by + +.

TABLE 2.—TREATMENT AND REACTIONS IN CASE 2

Date	Blood, Wassermann Reaction	Cerebrospinal Fluid			Treatment	
		Cells	Noguchi Globulin	Wassermann Reaction	Salvarsan	Mercury
1911—						
September 23	++	1,094	++	0.2 c.c. ++		
September 27 to October 12	....	....	....	.....	3×0.2 gm.	
October 16	++	118	+	0.2 c.c. —		
October 19 to November 29	....	....	....	.....	7×0.2 gm.	
December 5	+±	60	+	1.0 c.c. +		
December 7 to December 14	+	....	....	.....	2×0.2 gm.	
1912—						
January 8 to January 15	....	....	....	.....	.....	2 inject. Hg salic.
January 21	—	9				
January 21 to March 4	....	....	....	.....	.....	6 inject. Hg salic.
March 8	±	46	+	1.0 c.c. ±		
March 12 to April 16	....	....	....	.....	6×0.3 gm.	
April 18	—	11	±	1.0 c.c. —		
May 7 to May 28	....	....	....	.....	3×0.3 gm.	
May 31	—	8	—	1.0 c.c. —		
July 16 to October 7	....	....	....	.....	.....	6 inject. Hg salic.
October 19	±	....	....	.....	0.9 gm. neo.	
October 26	++	22	—	1.0 c.c. —		
October 26 to December 14	....	....	....	.....	7×0.9 gm. neo.	
1913—						
January 13 to March 25	....	....	....	.....	.....	7 inject. calomel
April 12	±	6	+	1.0 c.c. —		
March 29 to April 19	....	....	....	.....	3×0.9 gm. neo.	
April 26 to June 21	....	....	....	.....	6×0.5 gm	
June 29 to August 18	....	....	....	.....	.....	6 inject. Hg salic.
August 30	—	3	±	1.0 c.c. —		
September 13 to February 21	....	....	....	.....	16×0.5 gm.	
1914—						
February 21	—	6	±	1.0 c.c. —		
1915—January 21	—					
Total					57 injections: 17.6 gm. salv. 9.3 gm. neo.	39 injections

December 12: Condition much improved. Nausea, vertigo and ringing in right ear have entirely disappeared.

December 17: Hearing: right, watch, 50 cm., whisper, 400 cm.; left, watch, 120 cm., whisper, more than 400 cm.; optic papillitis has diminished; facial paralysis has disappeared.

Nov. 9, 1912: Feels well except for occasional ringing in right ear when tired. Physical condition unchanged. Slight optic papillitis persists.

May 7, 1914 (Report from patient's physician): Feels perfectly well except for occasional tinnitus in right ear when tired. Hearing: right, watch, 4 feet, left, 18 inches. Weber

August 28: Partial left facial paralysis with inability to close left eye. Mercury stopped. Deafness persisted until September 5, then passed off slowly, and left facial weakness became less marked. Headaches continued; patient unable to sleep.

September 11: Mixed treatment started.

Admitted September 23. Status praesens: patient very apathetic and mentally dull. Distinct left facial paralysis. Left pupil larger than right; fundi normal. Tendon reflexes all exaggerated. Hearing: watch, 50 cm. with either ear; whisper, right, 9 meters, left, 4.5 meters.

October 12: Immediate improvement followed treatment. To-day subjectively normal. No facial paralysis. Hearing same.

November 16: Free from symptoms. Hearing; right, watch, 165 cm., whisper, 15 meters; left, watch, 170 cm., whisper, 9 meters.

March 12, 1912: Tendon reflexes in arms exaggerated. Ophthalmoscopic: right disk normal color; veins engorged and tortuous; left disk red, nasal outline blurred; veins engorged and tortuous. Hearing: watch, right, 175 cm., left, 180 cm.

May 31: Ophthalmoscopic picture normal. Tendon reflexes in arms still exaggerated.

December 15: Feeling perfectly well. Fundi normal; reflexes normally active. Hearing: watch, right, 80 cm.; left, 100 cm.

May 23, 1914: Feeling well; right pupil larger than left; reaction to light is prompt, but excursion is diminished.

TABLE 3.—TREATMENT AND REACTIONS IN CASE 3

Date	Blood, Wassermann Reaction	Cerebrospinal Fluid			Treatment	
		Cells	Noguchi Globulin	Wassermann Reaction	Salvarsan	Mercury
1912—						
April 16	+	190	±	0.8 c.c. ++		
May 6 to May 20	....	....	....	.....	3×0.3 gm.	
May 22	++	23	±	1.0 c.c. ++		
May 29 to June 11	....	....	....	.....	3×0.3 gm.	
June 19 to June 27	....	....	....	.....	2×0.6 gm. neo.	
July 2	+	7	....	1.0 c.c. —		
July 11	....	....	....	.....	0.6 gm. neo.	4 inject. Hg salic.
September 6	++	4	—	1.0 c.c. —		
September 9 to September 23	....	....	....	.....	5×0.9 gm. neo.	25 rubs
November 22	+	0	....	1.0 c.c. —		
November 25 to January 1	....	....	....	.....	6×0.9 gm. neo.	3 inject. calomel
1913—						
April 8	++	5	—	1.0 c.c. —		
April 1 to May 27	....	....	....	.....	8×0.5 gm.	2 inject. Hg salic.
September 30	±	1	—	1.0 c.c. —		
October 1 to February 16	....	....	....	.....	12×0.5 gm.	4 inject. Hg. salic.
1914—						
February 16	—					
April 27	++	1	—	1.0 c.c. —	0.5 gm.	
1915—February 4	—	7	—	1.0 c.c. —		
Total					41 injections: 12.3 gm. salv. 11.7 gm. neo.	13 injections, 25 rubs

TABLE 4.—TREATMENT AND REACTIONS IN CASE 4

Date	Blood, Wassermann Reaction	Cerebrospinal Fluid			Treatment	
		Cells	Noguchi Globulin	Wassermann Reaction	Salvarsan	Mercury
1912—						
November 9	+±	12	—	1.0 c.c. —	0.75 gm. neo.	
November 22 to November 29	....	....	....	.....	3×0.9 gm. neo.	
December 6	±	....	....	.....	0.9 gm. neo.	
December 2 to January 13	....	....	....	.....	.....	4 inject. calomel
1913—January 13	—					
Total					5 injections: 3.45 gm. neo.	4 injections

Left knee jerk slightly greater than right; reflexes otherwise normal. Hearing: acoumeter, right normal, left normal; whisper, right normal, left normal. Lower tone limit: right, 16 d. v., left, 16 d. v. Upper tone limit: Galton whistle normal. Bone conduction: right normal, left normal. Rinné positive on right and left. Patient does not lateralize sound. Normal tone duration for all forks (Edelmann set). There is an old perforation of the left drum.

Jan. 21, 1915: No change in general physical condition. Air and bone conduction for watch tick normal.

CASE 3 (No. 655).—Man, aged 25, sailor. Exposure Sept. 10, 1911. October 18, chancre. November 15, severe frontal headache, worse at night; pain in eyes; hyperesthesia of scalp. November 25, salvarsan intravenously. Headaches disappeared one week, then returned.

December 26: Sudden deafness, practically complete, in right ear, continued until Jan. 22, 1912, when patient received salvarsan intravenously, when headaches and deafness gradually disappeared. February 15 to March 31, 45 grains of potassium iodid a day.

Admitted April 11, with headaches and pains all over the body. Status praesens: pupils oval, equal and react normally; optic disks both hyperemic. Hearing: watch, right, 150 cm., left, 200 cm. Reflexes: biceps exaggerated; radial periosteal, patellar and Achilles tendon very active.

May 3: Headaches continue; patient nervous and depressed.

May 13: Headaches almost gone; mental depression has disappeared.

April 22, 1914: Hearing: acoumeter, right, 7 meters; left, 7 meters; whisper, right normal, left normal. Lower tone limit: right, 18 d. v., left, 20 d. v. Upper tone limit Galton whistle normal with either ear. Bone conduction with C 256 normal on either side. Rinné positive right and left. C 256 fork referred to the left ear. There is normal tone conduction duration for all forks, both by air and bone conduction (Edelmann fork set). There are no gaps or islands in the scale of audition.

Feb. 4, 1915: Has had no treatment for past year. Feeling perfectly well. Hearing: watch, right, 80 cm., left, 150 cm. Bone conduction good. Does not lateralize sound.

CASE 4 (No. 884).—Man, aged 25, waiter. October, 1911, chancre. Jan. 1, 1912, generalized rash, dizziness, severe headache, blurring of vision, pains in eyes. These symptoms constantly present since onset, but were slightly diminished following a course of inunctions in May. Since August headaches and dizziness more severe, and mental depression marked.

Admitted Nov. 7, 1912, complaining of general depression, dizziness, buzzing in ears, blurred vision and ulcer on lip. Status praesens: pupils and fundi normal; slight lateral nystagmus with eyes in position of extreme rotation. Hearing: watch, right, 12 cm., left, 26 cm. Tendon reflexes all very active.

November 12: Ulcer on lip healed.

November 17: Vision better; dizziness has disappeared; buzzing in ears still present. Has sensation of "something creeping over lower back."

November 28: Feeling well; no buzzing in ears for past four days; hearing improved; watch, right, 32 cm., left, 45 cm.

December 15: Well except occasional headaches and blurring of vision. Eyes normal; no nystagmus. Hearing acute; watch, right and left, over 100 cm.

Jan. 13, 1913: Disappeared from observation.

CASE 5 (No. 857).—Man, aged 32, bookmaker. Jan. 15, 1912, multiple chancres, followed in one week by intense headache and severe lumbar pain, causing patient to go to bed. February 2, generalized cutaneous rash. Treatment, pills and potassium iodid for four months. Rash faded slowly but

TABLE 5.—TREATMENT AND REACTIONS IN CASE 5

Date	Blood, Wassermann Reaction	Cerebrospinal Fluid			Treatment	
		Cells	Noguchi Globulin	Wassermann Reaction	Salvarsan	Mercury
1912—						
December 7	+	181	++	0.8 c.c. ++		
December 12	....	....	....	.....	0.6 gm. neo.	
December 19	+±	....	....	.....	0.75 gm. neo.	
December 26 to January 2	....	....	....	.....	2×0.9 gm. neo.	
1913—						
January 7	+	23	±	1.0 c.c. ++		
January 9 to January 16	....	....	....	.....	2×0.9 gm. neo.	
February 13 to March 25	....	....	....	.....	.....	7 inject. Hg salic.
April 5	—	6	±	1.0 c.c. —		
April 5 to July 25	....	....	....	.....	7×0.5 gm.	
1914—						
January 12 to April 14	....	....	....	.....	.....	9 inject. Hg salic.
April 14	—	4	±	1.0 c.c. —		
Total					13 injections: 3.5 gm. salv. 5.0 gm. neo.	16 injections

TABLE 6.—TREATMENT AND REACTIONS IN CASE 6

Date	Blood, Wassermann Reaction	Cerebrospinal Fluid			Treatment	
		Cells	Noguchi Globulin	Wassermann Reaction	Salvarsan	Mercury
1911—						
July 29 to August 15	++	....	....	.....	3×0.2 gm.	
August 16	....	10	+	0.2 c.c. —		
August 22 to September 19	....	....	....	.....	5×0.2 gm.	
September 22	+±	6	—	0.2 c.c. —		
September 26 to November 16	....	....	....	.....	2×0.2 gm. and 5×0.3 gm.	
November 20	+	3	—	1.0 c.c. —		
November 21 to March 29	....	....	....	.....	.....	12 inject. Hg salic.
1912—						
April 2	±	1	—	1.0 c.c. —		
April 17 to May 21	....	....	....	.....	2×0.3 gm.	
July 15 to July 22	+	....	....	.....	2×0.5 gm.	
1913—						
January 20	++	1	—	1.0 c.c. —		
January 22 to February 19	....	....	....	.....	4×0.9 gm. neo.	
February 25	....	....	....	.....	0.75 gm. neo.	
March 5 to March 19	....	....	....	.....	3×0.5 gm.	
March 27	....	....	....	.....	0.6 gm.	
March 31 to May 5	....	....	....	.....	.....	4 inject. calomel
Total					28 injections: 7.2 gm. salv. 4.35 gm. neo.	16 injections

lumbar pain quickly responded to specific treatment until May, when both headache and lumbar pain returned, again causing patient to go to bed for one week. Symptoms again disappeared under pill treatment. June 15, salvarsan intravenously, followed by eighteen inunctions. Free from symptoms until September 15, when there was sudden diplopia and attack of unconsciousness, lasting two hours. October 1, second attack of unconsciousness, followed in two hours by complete aphasia, lasting three days, but during this period patient was conscious and clear mentally. October 20, ringing in left ear, followed by deafness.

Admitted December 6, with dizziness, deafness, failing memory, and sore throat. Has lost 30 pounds in six weeks. Status praesens: right pupil larger and reacts less extensively to light than left. Hearing: watch, right, 40 cm., left, 12 cm. Bone conduction for watch less over left mastoid than right. Tendon reflexes exaggerated, especially in arms.

Jan. 12, 1913: Except for relative deafness in left ear, feels well.

July 1: Ringing in left ear present for past three weeks. Hearing: watch, right, 100 cm., left, 50 cm. None of the forks heard over left mastoid. Weber to right.

July 25: Frequent headaches.

Jan. 12, 1914: Feeling perfectly well. Hearing: watch, right, 120 cm., left, 50 cm.; whisper, right, 3 meters, left, 1 meter. All reflexes are still very active.

April 16: C_2 fork: right, air conduction normal duration, left, 10 seconds shortened. C_3 right, air conduction normal, left, 13 seconds shortened. C_4 right, air conduction normal, left, 14 seconds shortened. Watch: right, 1 meter, left, 50 cm. Whisper, right, 7 meters, left, 150 cm. Lower tone limit: right, below 64 d. v., left, above 128 d. v. Upper tone limit: right, above 2,848, left, above 2,848 d. v. Bone conduction with fork C 128: right, normal duration, left, 16 seconds shortened. Rinné: right, positive, left, negative. Both membrani tympani normal in appearance.

CASE 6 (No. 345).—Man, aged 25, machinist. January, 1910, chancre followed by secondaries. Treatment: Thirty-four mercury injections in eight weeks. Four months later three ulcers appeared on face. Since then irregular treatment by mouth.

December, 1910: Sudden dimness of vision and diplopia, accompanied by nearly complete deafness in both ears, dizziness and inability to stand because of vertigo. Two weeks later, salvarsan intramuscularly followed by complete

disappearance of symptoms in one week. Free from symptoms until three weeks ago, when paralysis of left leg suddenly appeared, persisting until present time.

Admitted July 25, 1911. Pupils normal, fundi normal. Spontaneous lateral nystagmus, more marked to the left. Hearing: watch, right, 34 cm., left, 2 cm. Whisper: right, 3 meters, left, 1.5 meters. Bone conduction: right, 6 seconds, left, 4 seconds. All forks heard with air conduction: C, not heard with bone conduction. Caloric reaction: right labyrinth is very irritable; left responds feebly. Drums: right normal, left contracted and sclerotic. Complete flaccid flexor paralysis of the left leg. Right leg sensation of touch is acute; pain, heat and cold entirely absent. Brown-Séquard phenomenon. Arm reflexes absent on either side. Tendon reflexes in the left leg exaggerated. Babinski and Oppenheim positive in the left.

July 31: There is to-day a remarkable increase of power in the left leg.

August 3: Patient steadily improving. Now walks well. Pain sensation in right leg is only slightly diminished.

August 6: Walks well; still throws left foot a little.

August 29: Left leg now entirely normal, except for exaggerated reflexes. Pain sensation still slightly diminished in right. Nystagmus definitely diminished.

September 18: Sensation in left leg is normal.

his left ear is more acute. Hearing: watch, right, is just heard when brought into apposition with the external ear. Watch is not heard over the mastoid process, but is faintly heard in the right frontal region. Left: watch is just heard when brought into apposition with the external ear. Bone conduction for the watch is absent. Whisper: right, 30 cm., left, 20 cm. Ordinary voice: right, 12 meters, left 1 meter.

Dec. 15, 1912: Feeling well, no headache. Hearing: Watch is not heard until brought into apposition with the external ear on either side. Whisper: right, 35 cm., left, heard when spoken directly into the external ear. Ordinary voice is heard at limits of the examining room on either side.

March 12, 1914. Feeling well; remained free from headache. Physical examination unchanged.

COMMENT

Cases 1 and 2 are rather typical "neurorecidives" with no definite meningeal symptoms before salvarsan treatment was instituted. Both showed involvement of the facial nerve on the side of the affected ear; the first had an optic papillitis at the time of the development of the deafness, and the other developed a similar condition a few months later. Both had general symptoms of an intense meningitis, and the cere-

TABLE 7.—TREATMENT AND REACTIONS IN CASE 7

Date	Blood, Wassermann Reaction	Cerebrospinal Fluid			Treatment	
		Cells	Noguchi Globulin	Wassermann Reaction	Salvarsan	Mercury
1912—						
September 26	+	135	++	0.1 c.c. ++		
October 28 to October 31	+	....	....	.....	.....	2 inject. Hg salic.
November 4	+	....	....	.....	0.45 gm. neo.	
November 7	+	....	....	.....	0.75 gm. neo.	
November 11 to November 15	....	....	....	.....	2×0.9 gm. neo.	
November 21	±	13	++	0.4 c.c. ++		
November 22	....	....	....	.....	0.9 gm. neo.	
November 28 to December 2	....	....	....	.....	.....	2 inject. calomel
December 5	....	29	++	0.4 c.c. ++		
December 9 to January 29	++	....	....	.....	.....	5 inject. calomel
1913—						
February 17 to June 17	....	....	....	.....	.....	20 inject. Hg salic.
June 26 to August 28	....	....	....	.....	9×0.5 gm.	
September 8	—	8	++	0.6 c.c. ++		
September 10 to December 1	—	....	....	.....	.....	9 inject. Hg salic.
December 11 to March 12, 1914	—	....	....	.....	7×0.5 gm.	
Total					21 injections: 8.0 gm. salv. 3.9 gm. neo.	38 injections

May 5, 1913: Feeling well; physical examination is negative, except for slight spontaneous nystagmus to the left on forced external rotation and diminished hearing in the left ear. Hearing: watch, right, 2.5 meters, left, 1.25 meters; whisper, right, 9 meters, left, 3 meters.

CASE 7 (No. 887).—Man, aged 42, fireman. Chancre followed by secondaries fifteen years ago. Irregular treatment by mouth for two years. February, 1911 (20 months ago), dull aching pain in left ear and left frontal headache persisting until three months ago, when headache shifted to right supra-orbital region. Left eye "turned in" one year ago. Difficulty in hearing with left ear and tinnitus for six months. No difficulty in walking, no dizziness, bladder, rectal or sexual disturbances.

Admitted Sept. 26, 1912, complaining of headache and deafness in the left ear. Status praesens: pupils equal, but reaction to light is slightly sluggish and the excursion limited. Well marked left internal strabismus. Beginning optic atrophy. Hearing: watch, right, 15 cm., left, patient cannot hear watch even when in apposition with the external ear. Whisper: right, 60 cm., left, unheard. Ordinary voice: right, 1 meter, left, unheard. Patient can hear loud shouting with the left ear at about 1 meter. Bone conduction for a watch tick absent on both sides.

November 17: Since the first intravenous treatment, patient has not once had even a suspicion of headache. He states that his general health is much improved and hearing with

brospinal fluids were turbid and gave very high cell counts. In both there was practically complete restoration of function of the nerves involved. Case 3 might also be regarded as a "neurorecidive" except for the fact that he had distinct symptoms of meningeal irritation early in the disease before any treatment was administered. The deafness appeared one month after the first salvarsan injection, but was promptly and apparently completely relieved by the second injection. The symptoms of meningitis reappeared, however, and the patient showed hyperemia of the optic disks when first examined by us. Case 4 had evidence of meningeal, auditory and optic nerve involvement at the time of appearance of the general secondary eruption. These symptoms were only partially alleviated by mercury inunctions, but there was complete return of function after a single short course of neosalvarsan. Case 5 had severe symptoms pointing to meningeal involvement before the outbreak of the secondary rash, which only slowly disappeared under mercury and iodids. Later he had two attacks showing profound involvement of the cerebral tract before the onset of deafness. Case 6 developed deafness, vertigo and visual disturbance while under mercury, with prompt alleviation of symptoms following a sin-

gle intramuscular injection of salvarsan. The persistence of the infection in the central nervous system was, however, made evident by the appearance of symptoms of a spinal cord lesion. In spite of a rapid disappearance of all abnormal elements from the cerebrospinal fluid, both the last two cases had some permanent auditory disturbance possibly due to scar formation.

Case 7 is an example of quite late involvement of the auditory and abducens nerves with beginning optic atrophy. The prompt relief of headache and improvement in hearing were quite striking, but in spite of prolonged and intensive treatment, there was only slow improvement in the cerebrospinal fluid. This case illustrates well the resistance of the long-standing infection to treatment compared with the rapid improvement and return to normal of the cerebrospinal fluids of the patients treated in the early stages of the disease.

These cases illustrate the relation of these disturbances of hearing to syphilitic infection of the central nervous system. Six of them showed definite evidence of extensive infection of the nervous system. The remaining case showed also definite signs of involvement, but here the process had not gone on to an extensive development. It is to be emphasized that in all these cases the treatment previous to the onset of the affection of the eighth nerve had been quite inadequate. This is also the experience of many observers during the past three years. It has been shown conclusively that such lesions arise only in cases inefficiently treated, and that the number of such cases occurring in any clinic is an index of the efficiency of the treatment of syphilis in that clinic. Thus Gennerich,[13] in the enormous syphilitic material in the Naval Hospital at Kiel, where the cases can be properly controlled and where the treatment is most thorough, has seen only two relapses of any kind during the past year.

The cases here reported demonstrate, however, the large amount of treatment which may be necessary in these conditions, and the necessity of repeated examination of the spinal fluid for intelligent treatment of all syphilitic disease of the central nervous system. In these patients, except the three in whom the condition had been of long standing, all signs of disease of the eighth nerve rapidly disappeared. Examination of the spinal fluid in one of them showed, however, that the process was still active within the cerebrospinal axis. Such a process, if left to itself, is certain sooner or later to reassert itself, resulting in severe and perhaps permanent damage to parts whose function is so important. It may perhaps be interesting in this connection to refer to the frequency with which syphilis of the auditory nerve occurs as a manifestation of tabes dorsalis. Glogau[14] recently called attention to this point, and it has also been emphasized by Schwartze,[15] Strümpell[16] and Oppenheim and Siemmerling.[17] In thirty cases of tabes which we have examined, 40 per cent. showed marked diminution of hearing in one or both ears, with diminution or complete loss of bone conduction for watch tick.

In conclusion, we would urge the necessity for a consideration of all lesions of the eighth nerve as possible manifestations of a disastrous form of a general infection—syphilis of the central nervous system—and emphasize the value of an examination of the spinal fluid in every case of this type, and the necessity of repeated examinations of the fluid for the intelligent treatment and subsequent observation of all patients suffering with this serious condition.

13. Gennerich, W.: München. med. Wchnschr., 1914, lxi, 513.
14. Glogau, O.: Ann. Otol., Rhinol. and Laryngol., 1912, xxi, 703.
15. Schwartze, H.: Handbuch der Ohrenheilkunde, Leipsic, 1892.
16. Strümpell, Adolf: Arch. f. Psychiat., 1881, xi, 71.
17. Oppenheim, H., and Siemmerling, E.: Arch. f. Psychiat., 1887, xviii, 120.

ROENTGEN THERAPY IN THE TREATMENT OF DEEP-SEATED MALIGNANT DISEASE *

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I have been using the Roentgen rays in the treatment of deep-seated malignant disease for over fifteen years,[1] but bearing particularly on the treatment of deep-seated malignant disease, I would refer to "The Treatment of Sarcoma by Means of the Roentgen Rays," [2] 1907; "The Roentgen Rays in the Treatment of Deep-seated Malignant Disease," [3] 1909; "The Healing Process of Osteosarcoma Under the Influence of the Roentgen Rays," [4] 1913; "Inoperable Primary Carcinoma of the Breast," [5] 1913, and "The Treatment of Recurrences and Metastases from Carcinoma of the Breast," [6] 1914. In this paper, therefore, I shall try to give the present status of the value of the treatment in deep-seated malignant disease, the theory of its action and the general technic, and will confine my reports of cases to those not previously reported. (Those who are especially interested can, therefore, refer to the other cases reported and I will avoid repetition.)

In general there has been a progressive improvement in results corresponding with the improvement in technic and with our increased knowledge of the action of the rays, together with the improvements in equipment, so that to-day results are being obtained that were not even dreamed of a few years ago.

THEORY OF THE EFFECTS OF THE ROENTGEN RAYS ON MALIGNANT DISEASE

The results obtained in the treatment of malignant disease depend primarily on the exceeding sensitiveness of pathologic cells to the Roentgen rays, for it is well known to all who have had experience with epithelioma, as an example, that with the same dose of rays given to the epithelioma and the surrounding tissue, the epithelioma undergoes degeneration and seems to melt away, while the surrounding healthy tissues may show no effect or nothing more than a little redness. It has been shown, too, by histologic studies made on tissues which have been subjected to the effect of the rays that these cells undergo degeneration before any effect is shown on the healthy cells.

* Read by invitation before the joint meeting of the Chicago Medical Society and Western Roentgenologists, March 3, 1915.

1. Pfahler, G. E.: The Treatment of Cutaneous Cancer by the Roentgen Rays, Proc. Am. Roentgen Ray Soc., Sept. 11, 1901; X-Ray Therapy, with Report of Cases of Epithelioma, Recurrent Carcinoma of the Breast, Carcinoma of the Uterus, Carcinoma of the Esophagus, Tuberculosis of the Skin and Psoriasis, Philadelphia Med. Jour., 1902; Notes on X-Ray Treatment of Cancer, with Report of Cases, THE JOURNAL A. M. A., Jan. 3, 1903, p. 8; Carcinoma and Tuberculosis Treated by the Roentgen Rays, ibid., Dec. 5, 1903, p. 1406; The Treatment of Epithelioma by Roentgen Rays, ibid., Nov. 21, 1908, p. 1761.
2. Pfahler, G. E.: New York Med. Jour., Dec. 21, 1907.
3. Pfahler, G. E.: Am. Jour. Med. Sc., April, 1909.
4. Pfahler, G. E.: THE JOURNAL A. M. A., Aug. 13, 1913, p. 547.
5. Pfahler, G. E.: New York Med. Jour., April 26, 1913.
6. Pfahler, G. E.: Surg., Gynec. and Obst., January, 1914, p. 90.

It is also well known that the more nearly cells approach the embryonal type the more sensitive they are to the rays, and among normal tissues the essential cells of glands are more sensitive than the stroma, and next to the glandular cells come the protective epithelium, such as the skin, mucous membrane, and intima of the blood vessels, and next to this the connective tissue cells.

The more highly specialized the more sensitive is the cell to the Roentgen rays; therefore the generative cells of the ovary and testicle are the most sensitive of normal tissue and following these the spleen, thymus, thyroid gland, liver, the lymphatics, muscle, nerves and connective tissue.

As a result of a thorough histopathologic examination of cancer tissue of the uterus and ovaries that had been subjected to irradiation, Haendly[7] found that a radiant treatment of two or three weeks' duration has a direct elective effect on cancer tissue, consisting in a primary injury to the cancerous cells, which leads to a disturbance in the growth of the cells, lack of mitosis and giant-cell formation, and, to a certain degree, to changes in the character of the cells (flat, scaly epithelium); and, finally, by karyolysis and disappearance of the non-nucleated masses of protoplasm, to complete destruction of the cells.

The connective tissue shows a new growth to replace the destroyed carcinoma cells. This newformed connective tissue becomes sclerotic and degenerates, just as the rest of the connective tissue; the smooth muscle atrophies and disappears almost entirely, and some of the muscle fibers show hyaline degeneration. In the ovary the primary follicles are completely destroyed and the vessels show hyaline degeneration of the adventitia and media; the latter is calcified here and there. From proliferation of the intima there is obliteration of numerous vessels; the elastic fibers swell and form clumps; and the plasma cells and eosinophil leukocytes disappear with the increasing sclerosis and hyaline degeneration.

Fig. 1 (Case 4).—Recurrent and metastatic carcinoma with involvement of the opposite breast, at the beginning of Roentgen treatment, May 1, 1914.

The influence of the Roentgen rays on living tissue, according to Wickham,[8] depends, first, on the sensibility of the individual cells; second, the quantity of rays and the duration of their absorption; third, the special effect of the particular degree of hardness of the rays; fourth, the period of time which has elapsed between the end of the exposure and the time of the histologic examination; and fifth, the filtration of the rays through the tissues themselves.

On the special sensibility of the younger cells depends the ground principle of Roentgen treatment, that is, that these pathologic cells will be affected by the rays that have already passed through healthy tissue cells without doing them harm. He finds that the histologic changes in pathologic tissues are affected in the following order: (1) the malignant tumors; (2) the lesions of the hematopoietic organs and the blood; (3) the blood tumors; (4) keloids, and (5) skin tuberculosis. He also calls attention to the fact that the results obtained will depend greatly on the individual technic.

Since in this paper I do not propose to make reports on any primary carcinoma of the breast, I can do little better than repeat my remarks and conclusions based on the twelve cases of inoperable primary carcinoma of the breast, previously reported.[9]

In all instances, this treatment involves a struggle and a considerable expense; but when one realizes that we are dealing with an otherwise hopeless class of patients, the results justify the effort. I do not know that any of these patients have been cured, and did not report them as such. I believe that no one knows absolutely when a patient is cured of carcinoma, no matter what the method of treatment may have been. In this group, an otherwise hopeless class of patients have been rendered free from symptoms of the disease from one to eight years. The treatment is not intended to replace or in any way to interfere with the operative treatment of carcinoma of the breast, but rather to supplement it, or offer hope to patients who are inoperable.

I believe that the results in primary inoperable carcinoma of the breast are at least 25 per cent. better than they were even two years ago, but the conclusions as given then can stand now, which were:

1. In inoperable cases of carcinoma of the breast, Roentgen-ray treatment offers a reasonable hope of relieving the patient of the symptoms of the disease, prolonging life, and possibly causing complete disappearance of the disease.

2. Patients have been relieved of the symptoms of the disease for from one to eight years.

3. No other method of treatment has ever accomplished so much in this class of patients.

4. A careful mastery of technic is essential to success.

Boggs[10] has also made an excellent report on the treatment of carcinoma of the breast in which he summarized twenty unfavorable cases for operation, classed as unfavorable because there was the extensive involvement of both axillary and supraclavicular lymphatics about to break down. Only five of the twenty patients were living at the time of the report, but every one of them was sufficiently benefited to justify the treatment. The pain was relieved for a period averaging a year. Nearly in every case the mass was reduced in size, and in some cases it became freely

7. Haendly, P.: Surg., Gynec. and Obst., April, 1914.
8. Wickham: Arch. d'electr. med., May 25, 1913.
9. Pfahler, G. E.: Inoperable Primary Carcinoma of the Breast, New York Med. Jour., April 26, 1913.
10. Boggs: The Roentgen Treatment of Carcinoma of the Breast, New York Med. Jour., Nov. 12, 1910.

V. 191

movable. Almost every one of these patients was able to perform her usual duties and be with her family, free from pain and from the offensive odor so distressing in carcinoma. The patients who died from internal metastasis did so without external symptoms, excepting swelling of the arm. As a rule the patient did not know that she was dying of carcinoma.

Freund[11] reports thirty-nine cases of mammary carcinomas in which there were two unaffected and in all the rest improvement for a greater or less period, with recovery from subjective symptoms. In five cases, after several years' latency there was recurrence that could not be controlled in any way; in one case, after four years' Roentgen treatment, there was complete recovery. Freund believes that ulcerated carcinoma of the breast is more amenable to cure by irradiation than subcutaneous ones, and, therefore, says that in amputation of the breast the sutures should not be too firm. He believes there is no clinical difference between treatment with Roentgen rays, mesothorium and radium.

RECURRENT AND METASTATIC CARCINOMA OF THE BREAST

There is probably no field in which the striking value of the rays in the treatment of carcinoma can be demonstrated so conclusively as in this class of cases, for in this class of cases there can be no question as to diagnosis. In most instances there has been a diagnosis made by a competent surgeon and a pathologic diagnosis by a competent microscopist; and when to this are added recurrences and metastasis, which in themselves are characteristic and which in most instances are entirely inoperable, their disappearance under the action of the rays, with no other agent, becomes conclusive proof, to my mind, of the great value of the Roentgen rays in the treatment of deep-seated malignant disease.

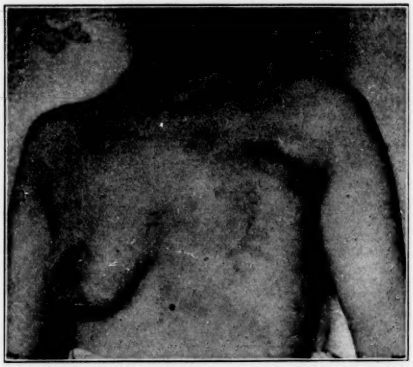

Fig. 2.—Complete disappearance of the metastatic carcinoma in Case 4, Dec. 1, 1914.

Fifteen cases of this class were reported in a previous paper,[12] which was read before the Seventeenth International Medical Congress, London, Aug. 12, 1913. I will add a few other striking cases in this report, one of which shows the most remarkable results of which I have ever known. In reporting any of the following cases it must be understood that with the successes I also have had many failures, for, as will be shown by the cases that I report, I undertake the treatment in many cases in which there can be little hope. In practically all patients there is some improvement. The patients are made more comfortable, pain is relieved, there is a diminution in the disease, and I am sure that life is prolonged.

CASE 1.—Miss H., aged 50 years, was referred to me by Dr. John B. Deaver, Nov. 2, 1912. Her right breast had been amputated on account of carcinoma by Dr. Deaver, in June, 1911. A tumor had been growing since December, 1910. At the time of the operation the tumor was about the size of a large egg. She noticed no evidence of recurrence until September, 1912, when the rib seemed to be prominent. When she was referred to me she had a mass of recurrent carcinomatous tissue about 1½ inches in diameter, elevated one-half inch, located inside the middle of the scar and firmly adherent to the rib. Because of its being firmly adherent, Dr. Deaver considered it inoperable.

The patient was given twenty-seven applications of the rays between Nov. 2, 1912, and June 14, 1913, at which time both in the judgment of Dr. Deaver and myself she was well. Since then she has remained well, which is now *a year and nine months.* She has gained in weight and is in every sense healthy. In an inoperable and otherwise hopeless case this must be looked on as a good result.

CASE 2.—Mrs. M., aged 48, referred by Dr. John B. Deaver, Oct. 28, 1914, had had her right breast amputated Sept. 22, 1913. She had noticed a tumor for nine months. For five months preceding the operation she had received some Roentgen-ray treatment in another city without improvement. Following the operation she received some postoperative treatment near her home. At the time she was referred to me, she had a recurrent carcinoma the size of half a hen's egg, firmly attached to the third and fourth ribs and the interspace between them.

The patient was given eight full doses of rays through eight different areas of skin, each dose of filtered rays representing 20 x = 160 x.* This series was given October 28, November 18, December 14 and January 18. When the last series was given the tumor had disappeared. The patient has had in all four series of treatments, the last one being given as an additional precaution. To all appearances she seems to be well.

CASE 3.—Mrs. G., aged 52, referred by Dr. John B. Deaver, March 30, 1912, had had the right breast amputated on account of carcinoma four months previously. When she was referred to me she had an induration in the inner side of the scar, with tumor formation over an area 3 by 1½ inches, and each stitch hole of the scar was indurated. The whole area was painful and the arm was swollen. Under active treatment all of these symptoms disappeared. The last treatment was given April 23, 1913, and she has remained well since that date, which is about *two years.*

CASE 4.—Mrs. K., aged 52, was referred by Dr. John B. Deaver, April 30, 1914. On June 20, 1912, Dr. Deaver removed the left breast on account of a carcinoma that had been growing for a year. The patient remained well until April, 1913, when, following a severe shock, she noticed little tumors developing over the operative area. These were supposed to be neurotic in origin, but they did not disappear, and after they had lasted and increased for a year, she consulted Dr. Deaver, who referred her to me, at which time

11. Freund, L.: Irradiation and Surgical Treatment of Malignant New Growths, Surg., Gynec. and Obst., June, 1914.
12. Pfahler, G. E.: The Treatment of Recurrences and Metastases from Carcinoma of the Breast, Surg., Gynec. and Obst., January, 1914, p. 90.

* One x = a Kienböck unit (measured by a definite shade of photographic effect on special photographic paper recommended by Kienböck); 10 x of unfiltered rays = an erythema or epilation dose; 10 x = Tint "B" of the special barium-platino-cyanid disks (Sabouraud and Noire); 20 x can be given without producing a burn because of thorough filtration and the use of hard rays.

the entire left mammary region was studded with nodules on both sides of the scar, extending into the axillary region and down to the left costal margin. This infiltration could then be traced across the sternal region to the opposite breast. The right breast was indurated and was believed by us to be carcinomatous (Figs. 1 and 2).

Within two days the patient was given a series of twenty full doses of filtered rays each representing 20 x, or in all 400 x units. When she returned at the end of three weeks for the second series, there was decided improvement. These series were repeated May 23, June 16, July 7, August 14 and September 22, or in all, six series of twenty doses each, totaling 2,400 x, and when she was examined by Dr. Deaver, Dec. 1, 1914, he could find no evidence of carcinoma. She has remained well since.

In this case we not only had an extensive metastasis over the operative field in the supraclavicular and axillary region, but involvement of the opposite breast, with complete recovery. With such striking results one cannot be skeptical of the value of the treatment.

CASE 5.—Mrs. B., aged 32, came to me Sept. 19, 1913. She had been operated on, Aug. 20, 1910, by Dr. John B. Deaver, for carcinoma of the right breast (confirmed by pathologic examination) and for recurrence, March 27, 1911. The patient said that she had had in all four operations. September 19, at the beginning of my treatment, the entire operative area on the right side was studded with nodules which were firmly adherent. These extended to the axilla, and in the right axilla there were masses from one-half to three-quarters inch in diameter firmly binding the tissues. There were large nodules in the supraclavicular region in the right side. The left breast contained a mass of tumor tissue with retraction of the nipple, with metastasis in the left axilla and in the left supraclavicular region. There were two small nodules in the scalp. About three inches of the second left rib and a small area in the third rib was destroyed and about an inch and a half of the right tenth rib, with disease of the eighth, ninth and tenth dorsal vertebrae, the fifth lumbar, and the upper part of the sacrum. Ordinarily such an extensive distribution of disease would preclude even the thought of accomplishing any good results, but this patient had an unusual amount of determination to get well. I therefore decided to see what could be accomplished.

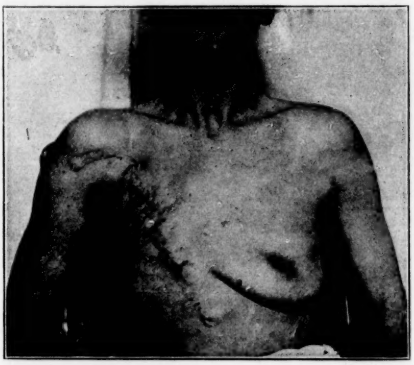

Fig. 3 (Case 5).—Extensive metastatic carcinoma over the operative area, in the axilla, supraclavicular region and the opposite breast, with bone involvement, Sept. 19, 1913.

She has received an enormous amount of treatment over the entire body during the past eighteen months, 237 doses averaging 15 x, or amounting to 3,555 x. As a result she has gained 17 pounds in weight, she gradually became able to look after her household duties and is now doing all her housework. She looks and acts very much stronger. All the nodules on her right chest have disappeared, as well as those in the right axilla and the right supraclavicular region. The mass in the left breast has shriveled, and while there is considerable retraction of the nipple, the area feels like fibrous tissue and is freely movable. The metastasis in the left axilla and supraclavicular region has disappeared. The disease in the second rib has healed. I believe the disease in the vertebrae is healing. The disease in the fifth lumbar and sacrum is at present giving the patient most of her symptoms, and she suffers considerable pain in this region. This patient is, therefore, not well, but is the only instance that I have ever known of in which there is undoubted healing of metastatic carcinoma of bone after it had once started. In this case we are undoubtedly dealing with a general carcinomatous condition, and the chances of ultimate failure are very great; but so far there has been progressive improvement, and the results have been the most remarkable of anything that I have ever seen (Figs. 3, 4, 5 and 6).

While the foregoing cases illustrate the value of the rays in the treatment of inoperable recurrence and metastasis, I believe this is not the chief field of usefulness for the rays. I believe the greatest field for usefulness is in postoperative treatment, and to this group should be added the inoperable primary carcinomas and the recurrent carcinomas.

CARCINOMA OF THE THYROID

CASE 6.—Mrs. M. G., aged 36, was referred by Dr. John B. Deaver, June 14, 1910. She had been operated on for carcinoma of the thyroid, July, 1908, and for recurrence, March, 1909, and May 6, 1910. June 14, 1910, when referred to me, she again had a recurrence, and Dr. Deaver considered it unwise to operate further. Active treatment was begun, and June 30, 1911, she seemed to be free from disease.

Sept. 9, 1911, she returned with pain in her right cervical region. This pain increased, and Roentgen examination, December 6, showed metastatic carcinoma in the second cervical. From this metastasis she died, July 6, 1912, but there was no recurrence of the disease in the thyroid. This was an ultimate failure, but I look on it as a brilliant temporary result, for the rapid recurrence after the third operation was completely controlled. The metastasis in the cervical spine may have taken place at any time previously.

This case is another strong argument in favor of active postoperative treatment.

CASE 7.—Mrs. L. S., aged 46, was referred by Dr. John B. Deaver, Feb. 10, 1913. Dr. Deaver had removed a carcinoma of the thyroid two weeks previously (confirmed by microscopic examination). He was unable to remove all of the disease, and so stated when he referred the patient. She was given fifty-six full doses between Feb. 10, 1913, and Dec. 2, 1913, at which time she seemed to be well. There has been no recurrence of the disease since.

A few weeks ago she was operated on for fibroma of the uterus, with hyaline degeneration, and a fibrocystic tumor of the right ovary, which was malignant. It would seem probable that this was an independent affection, and the result in the disappearance of the remaining disease which was known to be present, following the operation in the thyroid gland is another very strong argument in favor of postoperative treatment.

CARCINOMA WITHIN THE ABDOMEN

The modern technic has given a new impetus to the treatment of carcinoma within the abdomen. Most of the cases treated, however, and reported, refer to carcinoma of the uterus, and in this field some encouraging results have been reported.

Amann[13] states that he has applied Roentgen therapy in fifty-two cases of uterine cancer. In the thirty-one absolutely inoperable cases of cancer of the cervix, five of the patients were completely or nearly cured, 29 per cent. thus being restored to health, when they had been absolutely doomed before. The improved technic accomplishes this, besides, without danger of Roentgen burns even with the far more extensive dosage, while the action on the cancer cells is more destructive. When the rays are applied both from front and back to act on an advanced cancer of the cervix, they act on the entire region, all the lymph glands and adjacent tissues feeling the effect, and thus a more thorough cleaning out of the malignant disease is possible than could even be realized by operative measures. In one case he had removed a cancer of the cervix three years before and a recurring tumor a year later. Again a tumor as large as a fist developed in the pelvic connective tissue, but this was treated with intensive Roentgen exposures and a complete cure followed. The sciatica-like pains and the contracture of the foot from pressure on the nerves vanished and the patient gained in weight. She was in good health for a long time, but died suddenly later without recurrence of pelvic trouble. Amann's experience has been so favorable that he thinks the improved technic for Roentgen therapy can be applied even in operable cases.

Krönig[14] reports sixty-four cases of carcinoma that were treated for the prevention of secondary growth after operation; of these, forty-three were treated almost exclusively with unfiltered rays, while twenty-one cases were treated partly with filtered and partly with unfiltered rays. Twenty-three of the forty-one patients undoubtedly died of carcinoma. From following the subsequent history of twenty-one cases, in which filtered rays were used, nineteen were undoubtedly free from carcinoma. Sufficient time had not elapsed to speak of them as definite cures, yet the result is so unusual that he says it will have to be credited to the treatment, and that recurrences are not so frequent when filtered rays are used after operation.

The experience of Krönig, Gauss, Krinski, Lembcke, Wätjen and Königsberger[15] has shown that with either mesothorium rays or filtered Roentgen rays, deep-seated carcinomas may be destroyed without material injury to the normal tissues. Their cases have been under observation now for two years. In cases in which operation is very difficult and the chances of recurrence are great, they have decided on radiotherapy in preference to operation; they particularly prefer radiotherapy to operation, when the carcinoma is readily reached by a cross-fire. If a carcinoma has been removed by operation, the patient should be given radiotherapy at intervals for at least two years to avoid recurrence.

Kotzenberg,[16] speaking of his results of roentgenotherapy in the treatment of cancer, says that five of the thirteen patients with inoperable uterine cancer were clinically cured by the roentgenotherapy alone, one for three years to date. The outcome is not known in two other cases. Among the twenty cases of uterine cancer recently reexamined, ten of the patients were found materially improved and two clinically cured. All the patients spoke of the relief of pain after the Roentgen exposures; life was rendered bearable and lengthened by two or three years in many cases.

Nordentoft[17] reports a remarkable result in metastatic carcinoma within the pelvis. The young woman had had one ovary removed fifteen months before for a supposed benign tumor; the cancer was in the remaining ovary, which was then removed. Three weeks afterward the Roentgen treatment was commenced when already there were several metastatic lumps to be felt; one in the pouch of Douglas was a nobby tumor as large as a fist. The Roentgen treatment was applied systematically, and the metastatic tumors subsided; others developed at other points again and again, and each time they retrogressed under Roentgen exposures. Several times Nordentoft had expected to present the patient at a meeting of his medical society, but each time new metastases developed in the interval between the sending in of the notice and the meeting. At present no tumors can be palpated, and there is nothing apparently abnormal in the pelvis except that the serosa is rough and irregular in the pouch of Douglas. He has not given up hopes of a final cure, as the metastases develop now with much longer intervals and seem to be more susceptible to the Roentgen rays. There is also a kind of auto-immunization to be counted on, like a vaccine therapy, from absorption of the cancerous tissue. The same idea was expressed by me in Case 4 (treatment of recurrences and metastases).

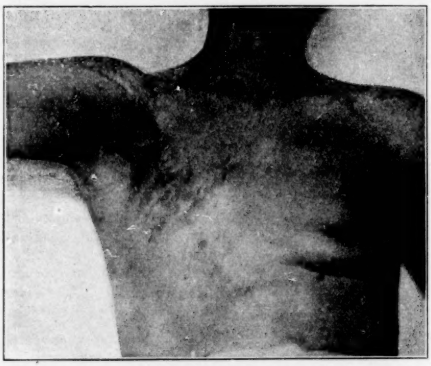

Fig. 4 (Case 5).—Disappearance of the metastatic disease with a shriveled fibrous movable mass in the opposite breast. Patient able to raise arm, the axilla being clear.

Good results have been reported by Gray[18] in the treatment of malignant disease of the bladder.

In my own experience I have had a few results that seem rather striking in the treatment of deep-seated carcinoma within the abdomen:

13. Amann: München. med. Wchnschr., 1914, lxi, 1713.
14. Krönig: Am. Jour. Obst., 1914, lxix, 205.
15. Krönig, Gauss, Krinski, Lembcke, Wätjen and Königsberger: Surg., Gynec. and Obst., November, 1914.
16. Gocht, H.; Kotzenberg, and Denks, H.: Roentgenotherapy at the Eppendorf Hospital, Beitr. z. klin. Chir., June, 1914; abst., THE JOURNAL A. M. A., Sept. 19, 1914, p. 1062.
17. Nordentoft, J.: Ugesk. f. Læger., 1914, lxxvi, 1541.
18. Gray, A. L.: The Roentgen-Ray Treatment of Malignant Disease of the Bladder Through a Suprapubic Incision; Report of a Case, Am. Jour. Surg., October, 1906.

Case 8.—Mrs. B., aged 47, was referred by Dr. John B. Deaver, Oct. 30, 1907. One and one-half years previously Dr. Deaver had operated and found an inoperable omental tumor with extensive adhesions involving the entire abdominal viscera. This patient received active Roentgen-ray treatment from me during the following months. She has remained reasonably well since that time, which is seven and a half years, but occasionally has developed symptoms of intestinal obstruction. Between the intervals, however, of these attacks she has been comfortable.

Case 9.—Mr. H. A., aged 30, was referred to me for treatment, April 6, 1914. He had been operated on, February 4, by Dr. Babcock for carcinoma of the sigmoid, with metastasis. The sigmoid was resected and the neighboring glands removed. He was given thirty-four full doses of rays between April 6 and April 9. This series was again repeated May 25, June 24 and August 3. Since this time he has remained perfectly well, has gained in weight, and to all appearances is perfectly well. Roentgen examination shows slight irregularity in the sigmoid but nothing that suggests carcinoma. I believe that the rays have been influential in preventing a recurrence and further metastasis.

Fig 5 (Case 5).—Roentgenogram showing destruction of 3 inches of the left second rib by metastatic carcinoma, with a focus of disease in the left third rib, made Feb. 20, 1914.

CARCINOMA OF THE STOMACH

I have not treated any carcinoma of the stomach recently, and have never seen any good results except in one case.

Case 10.—Mr. G. V., aged 54, was referred to me Nov. 22, 1904. Dr. Joseph Price had performed an exploratory operation and found an inoperable carcinoma of the stomach—the tumor being about the size of a fist. The abdomen was closed and the patient was not expected to live more than a month or two. He was weak and bedfast—had to be moved on a stretcher for treatment to the hospital. In six weeks he walked from the hospital, and in six months was attending to business. He then developed symptoms of appendicitis. Dr. Joseph Price was again called to operate. He found no appendicitis and he could not find the carcinoma of the stomach. He found extensive adhesions about the stomach, which Dr. Price said he thought might be due to either his previous operation or to treatment. Three weeks later the patient died. No necropsy was obtained. Therefore, while the result seems remarkable, it is not conclusive.

Fig. 6 (Case 5).—Roentgenogram showing healing of the metastatic carcinoma of the left second and third ribs, after Roentgen treatment, made Feb. 10, 1915.

CARCINOMA OF THE TONSILS

Case 11.—Mr. U., aged 80, was referred by Dr. Ernest Laplace, Nov. 2, 1911. He had a tumor growing in his right tonsil for a year. A section was removed, and pathologic examination showed it to be epithelioma. At the time of beginning treatment the tumor of the tonsil was about an inch in diameter, hard, immovable and ulcerated. The patient had large submaxillary glands which were believed to be metastatic. In four months the tumor of the tonsil had disappeared and the submaxillary glands were no longer palpable. He died Feb. 17, 1913, or about ten months after he appeared to be well. The cause of his death was not reported to me, but was probably old age.

CARCINOMA OF THE LARYNX

Case 12.—Mr. F., aged 69, was referred by Drs. William Teller and Arthur W. Watson, May 20, 1914. This tumor, which was located beneath the left vocal cord, was regarded by Dr. Watson as an adenocarcinoma. The patient received four series of treatment within three months, each series being twenty-five doses cross-firing on the tumor in the larynx, and at the end of this time he seemed to be well and has received no Roentgen-ray treatment since.

Good results have been reported in the treatment of carcinoma of the larynx by Scheppegrell[19] and Delavan.[20]

DEEP-SEATED SARCOMA

My previous papers[21] on sarcoma contain reports of some really remarkable results, and some of these patients have remained well covering periods of from three to twelve years. I have always felt that sarcoma was more amenable to roentgenotherapy than carcinoma, and my general results show a healing process in about 50 per cent.

Levy-Dorn[22] reports two cases of sarcoma in which the patients were well six years. One case was a recurrent sarcoma in the neck and metastasis in the groin. Both disappeared. The second case was a periosteal sarcoma of the femur. Levy-Dorn quotes Kienböck's report of ninety cases in which 18 per cent. disappeared, 57 per cent. improved and 25 per cent. were uninfluenced.

A very remarkable result was reported in a case of sarcoma in which there had been metastasis to the vertebrae, by Seeligmann.[23] A girl, aged 25, in August of 1911, had a tumor filling the entire abdomen. The vertebrae were intact. A 10-pound intraligamentous tumor was removed and found to be a spindle-cell sarcoma. After three months the patient

19. Scheppegrell, W.: A Case of Cancer of the Larynx Cured by the X-Rays, Jour. Advanced Therap., December, 1902.
20. Delavan, D. Bryson: The Result of Treatment of Laryngeal Cancer by Means of the X-Ray, Laryngoscope, November, 1902.
21. Pfahler, G. E.: The Treatment of Sarcoma by Means of the Roentgen Rays, New York Med. Jour., Dec. 21, 1907; The Healing Process of Osteosarcoma Under the Influence of the Roentgen Rays, The Journal A. M. A., Aug. 23, 1913, p. 547. Babcock and Pfahler: A Conservative Treatment of Sarcoma, Surg., Gynec. and Obst., February, 1908, p. 160.
22. Levy-Dorn: Berl. klin. Wchnschr., Jan. 1, 1912.
23. Seeligmann: München. med. Wchnschr., March 25, 1913, p. 637.

V. 191

seemed to be well, but recurrence was noticed in nine months, and in November, 1912, the tumor entirely filled the abdomen again. There was evidence of metastasis in the twelfth dorsal and first lumbar vertebrae. The abdomen was opened and a tumor was found larger than the original, everywhere adherent, and inoperable. She was demonstrated well eight weeks after beginning treatment before the physicians' congress in Hamburg. The tumor had entirely disappeared and no signs of disease were found in the vertebrae.

Remarkable cases have also been reported showing the healing of large inoperable abdominal sarcomas, by Shoemaker[24] and Skinner.[25]

To the previous cases of sarcoma reported I should like to add the following rather striking results:

CASE 13.—Mr. N. B., aged 64, was referred to me by Dr. John B. Deaver, March 26, 1914, with an inoperable sarcoma in the right side of his neck under the jaw, about 3 inches in diameter and about one and one-half times the size of a hen's egg. He was given fifteen doses of rays, March 26 and 27. This series was repeated April 9, April 30 and May 21. June 18 he was given twelve doses, and July 30 nine doses, each of these doses being given through a different area of skin cross-firing on the center of the growth. At this time the tumor had practically disappeared and he has had no treatment since, and I believe he is perfectly well. He was seen by Dr. Deaver, Sept. 24, 1914, when he said he could find no evidence of the disease. We have here a case of inoperable sarcoma of the neck disappearing with a total of eighty-one doses, or 1,620 x (Figs. 7 and 8).

Fig. 7 (Case 13).—Sarcoma, March 26, 1914, before Roentgen treatment, showing part of the scheme of cross-fire.

CASE 14.—Mrs. W. W., aged 39, was referred by Dr. John B. Deaver, May 29, 1913. In October, 1912, Dr. Deaver removed a myxosarcoma, the size of a grapefruit, from her right thigh. A recurrence developed and was removed two weeks previous to the beginning of the Roentgen treatment. She was given twenty-four doses within a year and has remained well.

CASE 15.—Mr. G. T., aged 75, was referred by Dr. H. H. Grace, May 11, 1914, at which time he had a sarcoma involving the hard palate, soft palate, crowding upward and filling two-thirds of the right antrum. It had involved the alveolar process, the front of the jaw, and projected three fourths inch below the palate. He was given 131 doses in five months, at the end of which time the disease had been reduced to about one-third, and since this type of sarcoma involving bone is not likely to disappear completely, we discontinued treatment. We believe the disease has been arrested and we hope permanently.

CASE 16.—Mr. Z. H., aged 45, was referred by Dr. E. B. Gleason, Jan. 31, 1913, after the removal of a round-cell sarcoma of the left tonsil, January 29. He was given thirteen full doses of rays in three weeks directed toward the tonsil. This has remained well. Jan. 9, 1915, he returned with a sarcoma of the left lower eyelid. He was given five doses directed toward this eyelid, January 9. February 1 there was not more than half the disease remaining.

The striking point about Case 16 is that the postoperative treatment of the tonsil seemed to arrest the disease. It is probable that the development of the sarcoma in the lower eyelid was independent of the primary growth.

TECHNIC

Improvements in technic are being made daily, but the three great lines along which improvement has been made is in filtration, cross-firing and the generation of more penetrating rays.

Filtration.—I[26] believe I was the first to recommend and demonstrate the importance of filters in removing the soft rays that are otherwise absorbed by the skin. I at first recommended and demonstrated the value of a layer of sole leather interposed between the source of the rays and the skin. This alone permitted me to use a quantity of rays that would enable me to give twice the amount of rays to the tumor tissue before damaging the healthy skin. This filtration has increased, however, so that at present I use 3 mm. of aluminum, and below this a layer of sole leather which permits probably four times the amount of rays to reach the deeper tissues than could be given through an area of skin without filtration.

Cross-Firing. — From the time I first began to treat deep-seated disease I used cross-firing, and this has been done by most of the leaders in America in Roentgen therapy; but the credit of elaborating this idea belongs to Gauss. In the treatment of deep-seated disease in the pelvis, he divided the total area of skin into many small areas, which permitted him to cross-fire many times on the central portion of the disease. In this way he reached the enormous doses of from 1,000 to 1,500 Kienböck units, but this means that he gave through no particular area of skin more than 20 x — at least this is all that I feel safe in giving.

In the treatment of deep-seated malignant disease the number of areas through which a disease can be treated will, of course, vary with each particular case, and the location of the disease, but I commonly use from four to forty areas, which means from four to forty full doses, or from 80 to 800 x units. This, of course, means infinitely more deep effect that was obtained in the early days when we used the total area of skin through which to give a single fractional dose of rays.

24. Shoemaker: Sarcoma of the Abdominal Wall, and Probably of the Pelvic Viscera, Which Has Disappeared Under the Use of the Roentgen Rays, Tr. Coll. Phys. Philadelphia, Dec. 2, 1913; Am. Med., 1903, vi, 1019.

25. Skinner, C. E.: Roentgenization in the Treatment of Cancer, THE JOURNAL A. M. A., Nov. 10, 1906, p. 1541.

26. Pfahler, G. E.: A Roentgen Ray Filter and a Universal Diaphragm and Protecting Screen, Arch. Physiol. Therapy, November, 1905.

Much of the good results in a case will depend on the skill and ingenuity with which the roentgenologist makes use of this principle of cross-firing.

Improvement in Equipment.—Until the past year it required ordinarily from twenty to forty minutes to give one of these full doses. It can be understood, therefore, how tedious it would have been to give forty such doses within a reasonable time, that it would have been exhausting to the patient, and probably not more than one dose could be given each day.

These disadvantages have been overcome, first by the invention of the Coolidge tube which permits the continuous use of large currents by means of which one can use a high degree of penetrating rays which can be kept constant. This invention has permitted the use of the transformer type of generator by which a large current can be utilized and therefore a large quantity of rays generated in a given time.

Stated briefly, my present technic in deep therapy involves the use of the Coolidge tube, excited by 5 milliamperemeters of continuous transformer current, with a resistance of 9-inch parallel spark gap, with the focal point 8 inches from the skin, run for five minutes and the rays filtered through 3 mm. of aluminum and one layer of sole leather, which gives approximately 20 x, or will double the tint B on the Sabouraud pastille placed at half distance. This means a double skin dose of filtered rays actually passing through each area of skin.

Interval Between Treatments.—In the very malignant patients I give my second series of doses over the affected area at the end of two weeks, the third series three weeks later, and the fourth series usually four weeks later. When the history points to a less rapidly growing disease, I prefer to allow three weeks' interval between each series, and when the disease has disappeared, or if there is any redness of the skin, I make the interval four or more weeks.

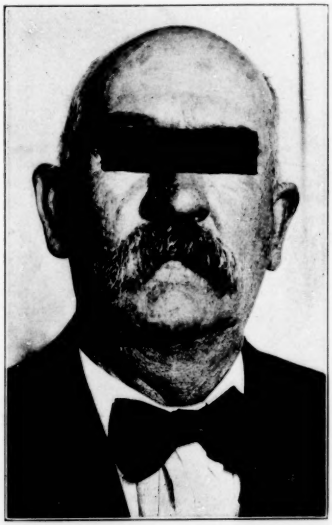

Fig. 8 (Case 13).—Two months after beginning treatment. No treatment after July, 1914. Patient still well, March, 1915.

Skin Effects.—I try to avoid any damage to the skin whatever, and at present even with crowding of the treatments even though erythema does develop. When one is dealing with a disease which is certain to destroy the patient, I believe one is justified in crowding the treatments even though erythema does develop. When one is treating over the beard area or the scalp there is of course likelihood of producing alopecia. Telangiectasis is likely to develop in the skin after a year or more, provided a dermatitis has been produced, and when a dermatitis has been produced, atrophy is likely to follow.

A Dose.—A dose means all that the skin can stand without producing dermatitis. With unfiltered rays it means tint B of the Sabouraud pastille scale, or 10 x of the Kienböck scale, or 5 H of the Holzknecht scale. When filtered rays are used and the measurement is made under the filters, this dose can be doubled, and that really means that five times the amount of rays are actually being produced, and it also means that five times the amount of rays reach the deeper tissues, for with the technic described above the skin dose with filters is obtained in one minute. It can be easily seen, therefore that to-day we are giving to the deeper tissues, in the treatment of malignant disease, hundreds of times more rays than were given in the days of fractional doses.

POSTOPERATIVE TREATMENT OF CARCINOMA

It is difficult to prove the exact value of postoperative treatment because some patients remain well from the operation alone, and up to the present time the postoperative treatment has been confined mostly to the more severe types, as is indicated in the recent paper by Rodman.[27] In other words, it has been used chiefly in the cases that would be expected to recur unless the rays can prevent it. Therefore, statistics of cases that have received postoperative treatment cannot be fairly compared with another list in which all types have been included.

I believe that all cases of malignancy should receive postoperative treatment, applied as soon after the operation as is possible, and with the full understanding that there is probably deep-seated disease present, and, therefore, treated by the principles covering deep technic; for instance, in the postoperative treatment of carcinoma of the breast, I send the rays through eight or ten different fields, and give from four to six such series three to four weeks apart.

The Use of Thyroid Extract.—During the past four years I have been administering, in most cases of carcinoma of the breast, small doses of thyroid extract, beginning with one-half grain three times a day, and at no time giving more than 2 grains three times a day. I give it on the theory that the application of the rays diminishes the normal thyroid secretion. I believe that this has increased my results. This has been more fully described in my paper before the international congress.[6]

CONCLUSIONS

1. Malignant disease that can be completely removed I believe should be dealt with surgically.

2. Each operation for malignant disease should be followed by postoperative treatment. The extent and character of this postoperative treatment will depend on the location of the disease.

27. Rodman, W. L.: Cancer of the Breast, THE JOURNAL A. M. A., Feb. 27, 1915, p. 707.

3. Where there is an absolute necessity for delay in operation from some other cause, the patient should be treated by means of the Roentgen rays, and this treatment should be directed toward the glandular area particularly.

4. Inoperable cases should always be given the benefit of the rays. Some of them will be removed and others made operable. Such treatment should be instituted at once and not as the patient approaches a dying condition.

5. Local recurrences yield to Roentgen therapy fairly well, and some of these patients I believe can be made permanently well.

6. Metastatic carcinoma, even when it affects the bones, has been shown to heal in at least one case which I reported.

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THE SUPRACLAVICULAR VENOUS PULSE IN MAN

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THE PRESSURE CHANGES IN THE AURICLE AND VEINS

If the slight pressure within the right auricle is recorded by a sensitive optically recording manometer of adequate efficiency, it is generally found that the pressure changes are composed of the following series of waves (Fig. 1 *A*).

A rise and fall (1, 2, 3) synchronous with auricular systole and diastole.

A sharp rise and fall (3, 4, 5) during early ventricular systole and apparently associated with the closure of the tricuspid valves or a movement of the auriculoventricular floor.

A slow stasis rise during ventricular systole (5, 6) sometimes marked at the closure of the semilunars by a notch or vibration at 6.

A diastolic rise continuing throughout systole of the ventricle.

It is evident that there are two main waves, an auricular or presystolic, and a sharp systolic wave, preceding the rise of the subclavian very definitely.

If the lateral pressure is recorded from an extrathoracic vein low in the neck in which the flow is not interrupted, the character of the waves changes (Fig. 1 *B*). The following waves are found:

A rise and fall (1, 2, 3) due to auricular systole and diastole. This is often preceded by a slight negativity.

A small notch (3, 4) corresponding to a similar rise in the auricle; but this is not followed by a sharp drop because it is cut short by a prominent elevation, *c*, which is exactly synchronous with the subclavian rise and therefore probably due to some arterial impact.

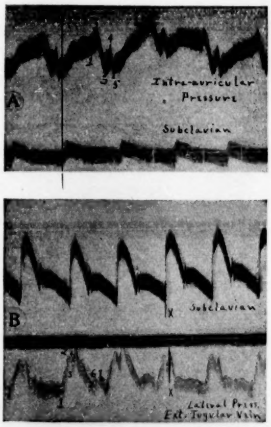

Fig. 1.—Records of intra-auricular pressure (A) and pressure in lower neck veins (B) recorded by sensitive venous manometer of adequate efficiency. Both curves compared with subclavian pressure changes. (Description in text.)

A late systolic rise and fall (to 6).

A diastolic rise (7) and fall (8).

If we label these waves consecutively, after the custom introduced by Mackenzie *a*, *c* and *v*, it is evident that:

1. The *a* wave within the extrathoracic veins is the homologue of the auricular wave (1, 2, 3) within the auricle.

2. The *c wave is not the homologue of the systolic elevation of pressure within the auricle* (3, 4, 5) due to movement of the *a-v* floor, for, (*a*) evidence of this wave, though much damped, is present in the tracings from the veins (3, 4) and the *c* wave occurs relatively later and *absolutely synchronous* with the subclavian rise.

3. After the first systolic elevation, the pressure in the veins mainly falls (*c* to 6), while in the auricle it rises (5-6).

The normal venous pulse can therefore not, as is currently stated, be regarded as an index of intra-auricular pressure. It follows the changes in intra-auricular pressure only during presystole and diastole —during systole the details of cardiac activity are obscured by the arterial impact.

THE DETAILS OF THE SUPRACLAVICULAR VENOUS PULSE IN MAN

If a receiving tambour be placed in the right supraclavicular fossa over the jugular bulb, a pure record from the internal jugular vein is not obtained, but a mixture of such a record with the pulsations from the subclavian or the carotid artery which are also located in the region covered by the tambour. Although the degree of pressure determines the extent of the arterial impact, optical tracings indicate that even with the lightest pressure of receiving tambour, the arterial element cannot be entirely eliminated.

The records from the supraclavicular region, however, are better suited to give pressure variations actually present in the auricle than are the records from veins less influenced by the impact of arteries but more distant from the heart. From the physical standpoint, the venous system is such a poor conducting system that every increase in the length of the venous column, every interpolation of valves and every augmentation of the damping by a stronger peripheral onflow, such as occurs when veins higher in the neck are selected, makes the recorded curve resemble less and less the true pressure variations near the heart. Since the term "venous pulse" is applied to records from various regions under the impression that the same type of record is obtained from each, it seems desirable to differentiate these curves by the term, *supraclavicular venous pulse*.

If simultaneous tracings from the supraclavicular region are taken by tambours in close approximation, we are able to compare the venous pulse obtained by

light pressure (upper) with the subclavian pulse obtained by heavy pressure (Fig. 2). The details of the latter correspond to a typical central pulse already described in a previous paper. The curve is useful, in this instance, as establishing with great exactness the onset of systole and diastole. A careful inspection makes it evident that such a record is not absolutely necessary, since the vibrations of the tricuspid and semilunar valves are often directly indicated on the venous record at *d* and *g*.

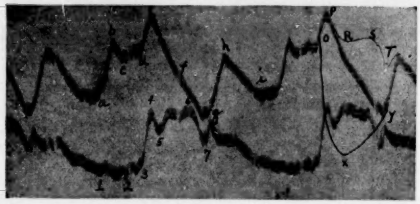

Fig. 2.—Simultaneous records of supraclavicular venous pulse (upper) and subclavian pulse (lower) in man. (Description in text.)

The supraclavicular tracing may therefore be divided into three periods, presystolic, systolic and diastolic. Each period contains, in hearts of average cycle length, *one* main wave, which may be designated as presystolic, systolic or diastolic, respectively. It can be seen that these correspond to the more familiar *a*, *c* and *v* waves of Mackenzie.

Presystolic Period.—The presystolic wave (*a* wave of Mackenzie) consists of a rise, *a-b*, and a fall, *b-c*. The rise is unquestionably due to auricular systole. The fall is commonly attributed to auricular diastole, for it is the only wave present when the auricle is beating alone after vagus block in animals.

Systolic Period.—The onset of ventricular systole is characterized by a preliminary rise of pressure (*c-d*) synchronous with the rise (2-3) of the subclavian record. This is interpreted as due to the closure of the tricuspid valves. It is the resultant of the sharp vibration recorded from the auricle at the beginning of systole. *Absolutely synchronous* with the rise of the subclavian at 3, occurs the rise *d-e* of the supraclavicular pulse obtained with light pressure. It is possible to ascribe this only to a direct impact of the underlying artery.

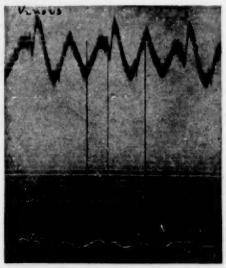

Fig. 4.—Simultaneous tracings of supraclavicular venous pulse by segment capsules (upper) and Jacquet polygraph tambour (lower).

After reaching the summit at *e*, the pressure sharply falls until it changes its slope at *f*, or, in other cases, begins to ascend slightly. Reasoning from animal experiments, it may be inferred that the pressure within the auricle during this period follws the curve sketched in at *o-x-y*. The pressure first falls (*o-x*) and then slowly rises (*x-y*) because of stasis. Only when arterial beats are feeble, is a curve in any way corresponding to the auricular pressure curve obtained. Therefore, the entire wave (*d-e-f*) is an impact from the underlying artery, poorly recorded on account of the light pressure of the tambour. If the pressure is gradually increased, the contour of the curve changes to correspond to the line drawn in at *R-S-T*, *giving* all the details of the typical subclavian pulse. It follows that, as a rule, the subclavian drop in pressure entirely overshadows the systolic rise of pressure in the auricle, and only rarely is the rise due to stasis obvious during the systole of healthy subjects.

Diastolic Period.—The wave *g-h-i* (*v* wave), as just pointed out, is, as a rule, entirely a diastolic affair.

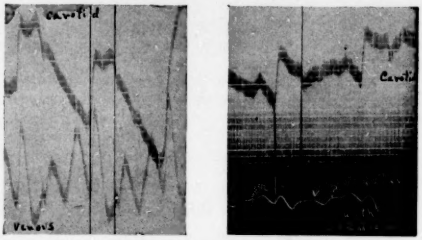

Fig. 3.—Two consecutive records of venous pulses recorded by optical segment capsules (left) and Zimmermann polygraph tambour (right).

Its fall after *h* occurs at the opening of the tricuspid valves. It remains questionable, however, whether the sudden rise, *g-h*, is merely a continuation of the auricular stasis wave, *x-y*, started during systole, or whether the upward movement of the auricle and large veins at the beginning of diastole may not definitely increase the volume of the veins.

MODIFICATION OF THE VENOUS PULSE BY POLYGRAPH TAMBOURS

It is of general interest to know how accurately the tambour levers of different polygraphs reproduce the variations of the venous pulse. For purposes of comparison with the mirror capsules, two procedures were employed. In some cases a record of the optical venous and radial were first recorded simultaneously, and then, without moving the apparatus, the same optical arterial curve was recorded simultaneously with the movements of a tambour lever projected on the photographic film. In other cases, three records were taken simultaneously, namely, an arterial, an optical supraclavicular venous and a tambour record from a place in the neck near by. The results of these two procedures were found to check very well. The records shown as Figures 3, 4 and 5 compare the optical tracings of the supraclavicular venous pulse with those taken by (*a*) the Mackenzie ink polygraph, (*b*) the Jacquet sphygmocardiograph and (*c*) the Zimmermann modification of the Uskoff sphygmotonograph.

As is evident from the comparison of these tracings, the polygraphs in common use do not reproduce the details of the supraclavicular venous pulse accurately. The heart sound vibrations and the isometric interval are not recorded at all. Hence the exact onset and termination of ventricular systole cannot be directly established nor the A_s-V_s conduction time accurately

determined by them. The relative amplitude of waves is incorrectly reproduced, and their relative prominence is often entirely wrong. The curves are frequently complicated by waves which have no existence in the vein or underlying artery but are due to inherent vibrations of the lever. This is particularly true of the Mackenzie tambours and, to a less degree, of those belonging to the Zimmermann apparatus. These artificial waves (labeled? in the records) may come after the *c* wave, as in Figure 5, in which case they may be misinterpreted for *v* waves, or, in case of vigorous heart action, they may give rise to a bifurcated wave which has been variously interpreted but which is probably entirely an artefact; or these oscillations may come after the *v* wave (Fig. 3), in which case they have been interpreted as *h* or *b* waves. While undoubtedly such a late diastolic wave sometimes exists in the case of slow hearts, there can be no question that many waves so interpreted are nothing but artefacts of the lever vibration. If these possible errors are ruled out, however, by an adequate foresight and correlation with other evidences of cardiac activity, as has been so ably done by the leaders in cardiograph work, it is clear that the records of the polygraph reproduce, with a fair degree of accuracy, the onset of the auricular wave and the fall of the *v* wave—two important features of the venous pulse.

It is interesting to inquire how forms of apparatus of such low vibration frequency as is represented in these systems can record the details of the jugular pulse at all. This is due largely to the fact that the veins are transmitting systems of low efficiency and that the details of the intra-auricular waves are considerably distorted or even annulled by the time the oscillations reach the neck veins. To record the waves still present in these veins requires only an apparatus of relatively low efficiency.

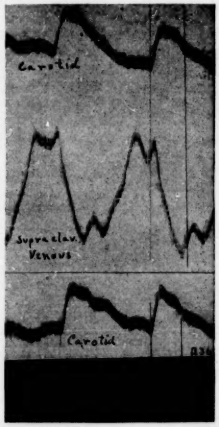

Fig. 5.—Two consecutive tracings of venous pulses first taken with optical segment capsules (upper) and then with tambour of Mackenzie ink polygraph (lower).

Laundry Sterilization.—In New York City some experiments were made to determine the effect of the usual routine of laundry washing in sterilizing clothes contaminated with bacteria. The following tests were made: *B. prodigiosus* and *B. coli* were smeared directly on the garment; placed on squares of gauze and folded into muslin and sewed into the garment; placed on squares made of flannel blanket, folded into muslin and sewed into the garment. These garments were then placed in the center of the net bag containing other clothing and the usual washing process applied. When the garments were returned to the laboratory they were treated as follows: A sterile swab was dipped into sterile broth and rubbed vigorously over the inoculated surface of the garment. The squares of gauze and flannel were cut into small pieces with sterile scissors and inoculated directly into the mediums. Of 42 cultures on nutrient broth 41 were positive, but all of the prodigiosus cultures were negative for color. *B. coli* on Conradi was negative; on lactose neutral red fermentation tubes, 17 were positive for color and 3 for gas; 4 were negative for color. Plates made from wash and rinse water (poured agar plates) showed in one instance for 1 c.c., 2,772 colonies, with a smaller number for other specimens. The temperatures of last hot rinsing water were from 50 to 60 C.—*Weekly Bulletin* Department of Health.

THE QUESTION OF SPONTANEOUS CIRRHOSIS OF THE LIVER IN RABBITS AND OTHER LABORATORY ANIMALS*

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In carrying on a series of experiments during the past three years on the experimental production of cirrhosis of the liver, I have from time to time noted statements by other workers that the ordinary laboratory animals, particularly the rabbit, are apt to show a spontaneous cirrhosis of the liver. In view of the importance of the question to others working along the same lines and along other lines where the spontaneous proliferation of connective tissue in these animals has an important bearing on results of experimental work, it seems as if a review of the literature and the results of my own findings might have some value.

Klopstock,[1] who did considerable work with rabbits in an endeavor to produce experimentally cirrhosis of the liver, stated that rabbits might show a spontaneous affection of the liver, with connective tissue proliferation, extensive enough to be considered a cirrhosis. Siegenbeck van Heukelom[2] expressed the same opinion.

Laffite[3] mentions finding two cases of the disease in rabbits. Von Hansemann[4] believed that a spontaneous tuberculosis could appear in guinea-pigs and produce cirrhosis of the liver.

Joannovics[5] and Christian both say that occasionally one finds a cirrhotic condition of the liver in rabbits and guinea-pigs that have not been used for experimental work and were supposed to be healthy animals.

Robertson,[7] in discussing a previous communication read at the meeting of the American Medical Association, said that at one time, in the Department of Pathology of the University of Minnesota, work was started on experimental alcoholic cirrhosis and that it had to be abandoned, as far as using the rabbit went, because of the numerous sclerotic changes which occurred in this animal, not only in the vessels, but also in the liver, kidneys and heart.

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1. Klopstock: Zur Lehre von der Lebercirrhose, Berl. klin. Wchnschr. 1910, Nos. 33 and 34.
2. Van Heukelom, Siegenbeck: Die experimentelle cirrhosis hepatitis, Ziegler's Beitr. z. path. Anat. u. z. allg. Path., 1896, xx.
3. Laffite: L'intoxication alcool, experimentale et la cirrhose de Laennec, Thèse de Paris, 1892.
4. Von Hansemann: Dissert. Verhandl. d. Deutsch. path. Gesellsch. 1904, viii.
5. Joannovics, Ueber experimentelle Lebercirrhose, Wien. klin. Wchnschr., 1904, xvii, 25.
6. Christian: Experimental Cardiorenal Disease, Arch. Int. Med., October, 1911, p. 468.
7. Robertson, H. E.: Discussion on Experimental Cirrhosis by Grover, THE JOURNAL A. M. A., 1913, Aug. 16, p. 461.

More lately Beitzke[8] has reported two cases of spontaneous cirrhosis of the liver in rabbits. According to the illustrations accompanying the article, a marked degree of cirrhosis was obtained. The animals were of the series that Stillings previously used in his tumor transplantation experiments.

On the other hand, Saltykow[9] and Lissauer[10] say that they have both conducted a great many necropsies on rabbits but have never seen spontaneous cirrhosis. Such workers as Fahr,[11] Fischler,[12] Kretz,[13] Ogata,[14] Opie,[15] and many others who have used rabbits very extensively in experimental work, make no mention of finding such conditions. Klopstock[1] and D'Amato[16] report that an infection in the liver of dogs with coccidia may give a cirrhosis. Saltykow[9] agrees with this.

During the last four years I have examined the livers from about three hundred rabbits. In every case careful microscopic examination has been made. In no instance has there been any evidence of what might be classed as a spontaneous cirrhosis. A cirrhotic reaction has been experimentally produced in ten cases by the use of alcohol, in one case by tying the common bile duct, in another case by the production of a pyemia, and finally in another case by chloroform intoxication. In this series are about twenty-five rabbits that died as a result of spontaneous infection with pyogenic bacteria. All showed extreme abscesses at necropsy. Three of these showed a well-marked proliferation of connective tissue in the interlobular spaces. In another case there was a marked infection of the liver with *Coccidia oviforme*. The accompanying photomicrograph shows two large cysts filled with coccidia and lying between them an area of liver tissue almost entirely obliterated by a dense area of fibrous connective tissue.

Two large liver cysts filled with coccidia, with an area of liver tissue between almost obliterated by dense fibrous connective tissue.

This series of rabbits is made up of animals from a great many sources. Many of them have been raised in the laboratory and one would expect the result to be the same as in any other series of a similar size.

None of the authors quoted, except Beitzke,[8] has given specific data. In his case the previous work done on the animals might easily have been complicated with a mild infection that was overlooked, or the transplanted tumor material may have introduced substances toxic enough to have produced a toxic form of cirrhosis. In our series no rabbit has been found that showed any evidence of cirrhotic changes in the liver except where such changes could be accounted for by experimental work or by infection present at the time. From the light of our experience we believe that the cases previously reported can be explained on the ground that either some infection present in the animal at the time had been overlooked, or else such an infection had been present previously and was healed. If the latter condition is the case, it seems that the percentage of its occurrence is not high enough in the least to affect the value of the rabbit as an animal for use in the laboratory for experimental work on cirrhosis of the liver; for if such a condition should occur in a large percentage of rabbits, it would certainly have appeared in our three hundred. Regarding the other laboratory animals, we have never seen a case of cirrhosis in a guinea-pig in a series of several hundred necropsies. As to the dog, our experience is too limited to be of value.

To sum up, we would consider that, so far, not sufficient evidence has ever been brought forward to invalidate the use of animals in experimental work on liver cirrhosis.

8. Beitzke, H.: Ueber spontan Cirrhose der Leber in Kaninchen Zentralbl. f. allg. Path. u. path. Anat., 1914, xxv, No. 14.
9. Saltykow: Experimentelle Forschung über die pathologische Anatomie des alkoholismus chronicus, Zentralbl. f. allg. Path. u. path. Anat., 1911, xxii, No. 19.
10. Lissauer: Lebercirrhose bei experimenteller intoxikation, Virchows Arch. f. path. Anat., 1914, ccxvii, Part 1, p. 56.
11. Fahr: Zur Frage des chronischen Alkoholismus, Verhandl. d. deutsch. path. Gesellsch., 1909, xiii.
12. Fischler: Experimentelle Lebercirrhose, Deutsch. Arch. f. klin. Med., 1908, xciii.
13. Kretz, R.: Ueber Lebercirrhose, Wien. klin. Wchnschr., 1900, No. 12, p. 27: Lebercirrhose, Verhandl. d. Deutsch. path. Gesellsch., 1904, viii.
14. Ogata: Beitr. z. exper. erzeugten Lebercirrhose und sur Patnogenese des Ikterus mit sperzieller Beruck-sichtigung der Gallenkapillaren bei der Unterbindung des Ductus choledochus und der Ikterogennergiftung, Beitr. z. path. Anat. u. allg. Path., 1913, xi.
15. Opie: Studies from the Rockefeller Institute for Medical Research, 1910, xi, 367.
16. D'Amato: Ueber experimentelle, vom Magendarmkanal aus hervorgerufene Veränderungen der Leber und über die dabei gefundenen Veranderungen die übringen Bauchorgane, Virchows Arch. f. Path. Anat., 1907, clxxxvii.

The Transmission of Disease.—Though this is of such vast import, it has received little investigation in the past. To the middle of last century, inquiries had led little further than the subscience of the subject—we distinguished, classified and named our various bodily inflictions. We also did more: for we had ascertained empirically the physiologic and therapeutic effect of many drugs—quinin, opium, mercury, iodid of potassium, ipecacuanha, and others; and also that great genius Jenner had discovered a wonderful fact which is at the basis of the theory of immunity, prevention, and cure. But the causes of disease and their mode of transference still remained hidden. At that epoch, however, and afterwards Pasteur, Koch, Lister, Behring and others created the science of bacteriology. But still, though the information thus obtained was of prime importance to the pathologist, the physician, and the surgeon, we still remained much in the dark regarding one important issue, namely, the exact path of transmission of many diseases from man to man. Bacteria are easily saprophytic and may have many paths of transmission, and I fear that we are still very much in doubt as to the most important of these numerous routes.—Ronald Ross, *Lancet*, London.

ACTION OF THE OPIUM ALKALOIDS

INDIVIDUALLY AND IN COMBINATION WITH EACH OTHER ON THE CORONARY ARTERY AND THE CORONARY CIRCULATION *

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Although opium and its derivatives are not classed by pharmacologists with the so-called "cardiac" drugs, every practitioner can testify to their value in the treatment of cardiac and vascular conditions. All the great clinical authorities concede to morphin an undisputed place in the armamentarium of cardiac therapy. Osler,[1] for instance, speaks of it, for nocturnal dyspnea, restlessness and distressing feelings of anxiety, as "invaluable," and in angina pectoris, it is put second only to the volatile nitrites. Indeed, Krehl[2] places it first, when he says, "In severe cases morphin is indispensable; in selected cases amyl nitrite and nitroglycerin are of help."[3] The general impression seems to be that the opiates in heart disease do not act on the heart and vessels themselves, but indirectly through quieting the nervous system. The evidence for this theory is chiefly empirical, and considering the importance of opium in the Pharmacopeia, it is surprising to find how few experimental data there are in the literature on the action of that drug on the circulation. Since the classical work of von Schröder,[4] little attention has been paid to the subject. A further investigation along these lines seems to be very desirable for several reasons.

In the first place, it is important to learn the action of opium and its derivatives on the heart and blood vessels by means of more recent and more exact pharmacologic methods.

In the second place, opium has been found to be the nidus of twenty-two or more alkaloids, at least a half dozen of which are present in sufficient quantities to produce definite pharmacodynamic effects. How do each of these act on the heart or vessels, and which of them is to be preferred in various cardiovascular conditions?

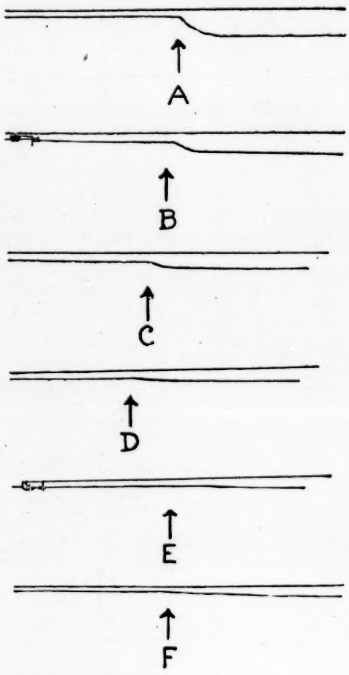


Fig. 1.—Action of opium alkaloids on rings of a freshly excised pig's coronary artery. Size of rings exactly the same in each case. Stretching weights, 30 gm.; lifting weights, 16 gm.; speed of drum, one revolution in twelve hours. Curve down indicates relaxation. *A*, effect of 10 mg. narcotin hydrochlorid; *B*, effect of 10 mg. papaverin hydrochlorid; *C*, effect of 10 mg. morphin sulphate; *D*, effect of 10 mg. codein sulphate; *E*, effect of 10 mg. thebain hydrochlorid; *F*, effect of 10 mg. narcein.

In the third place, the work of Straub,[5] Bürgi,[6] Faust[7] and others, indicates that combinations of two or more drugs may sometimes produce pharmacologic effects very different from that of individual drugs; that two drugs may, to use a technical expression, potentiate or antagonize each other's action. Therefore, in choosing from the numerous combinations of opium alkaloids now on the market, it is necessary to bear these synergistic and antagonistic phenomena in mind.

The author has been for some time engaged in the study of the action of the opium alkaloids on the circulation, and in this paper proposes to report his work on one of the least familiar phases of the subject, namely, the action of these alkaloids individually and in combination with each other on the coronary arteries and coronary circulation.

METHODS OF STUDY

The effect of drugs on the coronary circulation has been studied in different ways. Broadly, the various methods may be divided into three classes: first, the oldest method of all, by perfusion of excised hearts; second, by studying the effect of drugs on excised arterial rings or strips, and third, by observing the effect of drugs on the coronary circulation in the living animal, with the opened chest and heart *in situ*. Each of these methods, as will be seen later, has its advantages, and each is also liable to errors and exposed to various objections. As far as I am aware, no systematic study of the pharmacologic action of the opium alkaloids on the coronary has been made by any of these methods. In the present research the subject was studied by all three methods.

I. THE METHOD OF ARTERIAL RINGS

This method of studying the action of drugs on arteries was originated by O. B. Meyer,[8] who, however, did not study the coronary artery. It was employed for studying the effect of epinephrin on the coronary by Langendorff[9] in 1906, Barbour,[10] and Janeway and Parks[11] in 1912, and in studying the action of the nitrites and the digitalis group of drugs by Voegtlin and Macht[12] in

* This investigation has been endowed by a grant from the American Medical Association through the Council on Pharmacy and Chemistry.
* From the Departments of Medicine and Pharmacology, Johns Hopkins University.

1. Osler: Practice of Medicine, 1913.
2. Von Krehl, in Van Mehring: Lehrbuch der inneren Medizin, 1914.
3. "In schweren Fällen ist Morphin nicht zu entbehren, in einzelnen Fällen hilft Amylnitrit oder Nitroglyzerin."
4. Von Schröder: Arch. f. exper. Path. u. Pharmakol., xvii, 96.
5. Straub: Biochem. Ztschr., 1912, xli, 419.
6. Bürgi: Deutsch. med. Wchnschr., 1910, Nos. 1 and 2.
7. Faust: München. med. Wchnschr., 1912, lix, 2489.
8. Meyer, O. B.: Ztschr. f. Biol., 1906, xlviii, 352.
9. Langendorff: Centralbl. f. Physiol., 1905, xxi, 551.
10. Barbour: Jour. Exper. Med., 1912, xv, 404.
11. Janeway and Parks: Jour. Exper. Med., 1912, xvi, 541.
12. Voegtlin and Macht: Jour. Pharmacol. and Exper. Therap., 1913, v, 77.

1913. Our method, described fully elsewhere, was briefly as follows:

METHOD

Rings of the coronary arteries of the pig were used. Although it has been shown that the arteries may be kept alive for more than a day under proper conditions, the best results are obtained by using fresh arteries, as soon as possible after the animal is slaughtered. Great care must also be taken in dissecting the arteries from the heart, not to overstretch or tear them. The artery is cut in rings about 2 mm. thick, and two or three of these rings are joined together in tandem fashion. A single ring would be sufficient to show a change, but by taking chains of two, three or four, the variation in the caliber of the vessels is magnified. The preparation is suspended in a small glass chamber, filled with warm Locke's solution at the temperature of 37 C. (98.6 F.) through which a constant stream of oxygen is kept bubbling. In case of narcotin, Ringer's solution must be used, instead of the alkaline Locke, which precipitates the alkaloid. One end of the chain of rings is fixed to the bottom of the chamber, while the other is connected to the short arm of the lever. The whole apparatus is immersed in a water bath or jacket for regulating the temperature. Great care must be taken to keep the temperature and flow of oxygen constant. The Locke's solution should be prepared with glass-distilled water to eliminate all metals that may be in the solution.

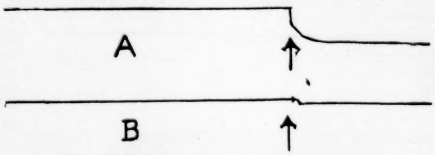


Fig. 2.—Pig's coronary artery suspended in a mixture of pig's blood serum and Locke solution. Stretching weight, 30 gm.; lifting weight, 18 gm. *A*, effect of 1 mg. of papaverin hydrochlorid; *B*, effect of 1 mg. of morphin sulphate, indicated by the arrow.

Perhaps the most difficult part of the experiment is the so-called "weighting" of the preparation. The artery when excised is in permanent tonus, and this tonus must be overcome before its reaction to drugs can be studied. To do this a stretching load is attached to the long arm of the lever, and the artery weighted or stretched until the tonus is overcome. This usually takes about twenty minutes or more, and the load varies with the thickness and the number of the rings used. After the artery has been relaxed, the stretching weight is taken off, and a permanent or lifting weight is attached. The size of the lifting weight will also vary with the preparation used. After the lifting weight has been put on and the elasticity of the artery has come to an equilibrium, the preparation is ready for testing, by removing the Locke's solution, and introducing in its place the substances to be tested, dissolved in oxygenated Locke's at 37 C.

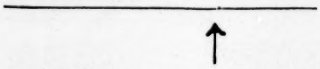


Fig. 3.—Pig's coronary artery. Stretching weight, 25 gm.; lifting weight, 11 gm. in Ringer's solution, showing how a combination of morphin and narcotin, indicated by the arrow, in the ratio of 10: 6 antagonize each other.

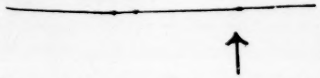


Fig. 4.—Pig's coronary. Stretching weight, 30 gm.; lifting weight, 16 gm. in serum Ringer, showing how morphin and papaverin, indicated by the arrow, antagonize each other.

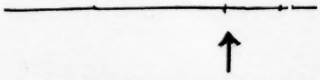


Fig. 5.—Pig's coronary. Stretching weight, 30 gm.; lifting weight, 16 gm. in serum Ringer, showing how codein and narcotein, indicated by the arrow, antagonize each other.

It is well to emphasize in this place that the experiment though simple is a rather difficult one, and requires practice to insure its proper working, so that a negative result — that is, an artery which does not respond at all—is generally of no value, unless repeatedly confirmed.

The optimum condition of tonus for each preparation has to be determined in each case by selecting the proper weights.

ALKALOIDS STUDIED

According to Winterstein and Trier,[13] there are contained in opium, beside protein matter, sugar, gum, resins, salts of various kinds and organic acids — twenty-two alkaloids. Some of these alkaloids are present only in minute quantities. The six principal alkaloids in point of quantity and probably also of pharmacologic importance, are morphin, narcotin, papaverin, codein, narcein and thebain. These were the chief alkaloids studied in the present investigation. According to Simon,[14] their quantitative proportions in opium are on the average as follows:

Morphin	about 10.0	per cent.
Narcotin	about 6.0	per cent.
Papaverin	about 0.1	per cent.
Codein	about 0.03	per cent.
Narcein	about 0.02	per cent.
Thebain	about 0.01	per cent.

In other words, this means that an average therapeutic dose of opium of about 0.1 gm. contains

0.01	gm. of morphin
0.006	gm. of narcotin
0.0001	gm. of papaverin
0.00003	gm. of codein
0.00002	gm. of narcein
0.00001	gm. of thebain

PURITY OF THE ALKALOIDS TESTED

Inasmuch as the present investigation deals with the action of individual alkaloids and of some of their mixtures, it was especially desirable to experiment with pure substances. I have made my observations with alkaloids sold on the market as chemically pure. Samples of these alkaloids were sent for analysis to Dr. W. A. Puckner of the Chemical Laboratory of the American Medical Association. The complete data of these analyses will be published later in a more technical paper on the action of opium alkaloids on the circulation in general. Suffice it here to state that so far the analyses have shown that the percentage of impurities in the alkaloids used was too small to produce any appreciable physiologic difference.

13. Winterstein and Trier: Die Alkaloide, Berlin, 1910.
14. Simon: Diss., Bern, 1903.

RESULTS

Of the six alkaloids mentioned above it was found that some produced dilatation of the coronary artery and some did not. Morphin was found to produce a moderate dilatation of the coronary, narcotin a still greater dilatation, and papaverin the greatest. Codein was found to produce much less dilatation or relaxation of the coronary; narcein hardly any dilatation, and thebain none at all. Heroin was found to behave practically the same as codein in this respect.

It has been shown by O'Connor,[15] Voegtlin and Macht,[16] and others, that normal blood serum contains vasoconstricting substances which maintain the blood vessels in a state of greater or less tonicity. It was interesting to determine whether such substances would inhibit or mask the action of the opium alkaloids noted above. The experiments were accordingly repeated by suspending arterial rings in serum instead of plain Ringer or Locke solutions.

It was found that exactly the same effect was produced. Figure 1 will illustrate the action of the alkaloids just mentioned.

It was found that comparatively small (therapeutic) doses of the alkaloids produced the relaxation described. Thus in the case of papaverin hydrochlorid, 1 mg. of the alkaloid in 100 c.c. of solution (= 0.001 per cent.) gave a distinct dilatation (Fig. 2).

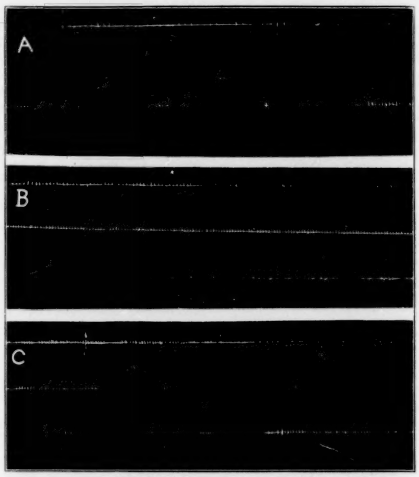


Fig. 6.—Perfusion of pig's heart with opium alkaloids by Krafkoff's method. *A*, upper line, drop outflow of normal Locke solution; middle line, time in seconds; lower line, perfusion with solution of morphin sulphate, 0.02 per cent. *B*, upper line, normal Locke; middle line, time in seconds; lower line, perfusion with papaverin hydrochlorid in Locke, 0.02 per cent. *C*, upper line, normal Locke; middle line, time in seconds; lower line, perfusion with mixture of morphin and papaverin, 0.02 per cent.

ACTION OF COMBINED ALKALOIDS

It is a well-known fact that the pharmacologic action of opium as such and of its principal constituent morphin are in some respects different, and that for therapeutic purposes sometimes one is indicated, sometimes the other. Thus, for instance, in intestinal disturbances, opium is found to act more favorably, and again in regard to the respiratory center, a dose of opium will be less depressant than an equivalent dose of morphin. This difference does not seem to be due to the inert and non-alkaloid constituents of opium; at least, it is asserted that a similar difference exists in the extracted mixture of opium alkaloids introduced by Sahli. The German pharmacologist Straub has recently advanced the theory, based on experimental work, that the difference between the pharmacologic action of morphin and opium is due to the presence of narcotin in the latter. Straub asserts that not only does the combination of morphin with narcotin (which he regards as a very little active alkaloid) produce a pharmacologic effect different from that of the sum of its components, but also that the action of morphin is "potentiated" or many times enhanced by the inactive narcotin. Thus small doses of morphin will, according to him, exhibit greater narcotic power through the addition of narcotin; and again, the depressant effect of morphin on the respiratory center is decreased by small quantities of narcotin. As a result of this work, Straub introduced a combination of morphin and narcotin salts of meconic acid. Faust also studied various combinations of opium alkaloids. Whether the pharmacodynamic effect of combinations of opium alkaloids is a summation or potentiation of their individual properties is of little importance; but the fact that such combinations do act differently from the individual components is of importance and requires further study.

In regard to the coronary circulation a very interesting phenomenon was noted in this connection. As has been stated above, morphin has a slightly dilator effect on the coronary artery. Narcotin was found to have a marked dilator action on the same. Now, if we test the effect of a combination of morphin and narcotin in the proportion of about 1 : 1 or 5:3, which is approximately their proportion in opium, this does not give a greater dilatation effect, but to the contrary, the vessel is affected very little or not at all. If the proportion of narcotin in the mixture is increased, a slight dilatation will be produced. In a similar manner a combination of morphin with the markedly dilating papaverin in the ratio of 10: 1 or less will result in little or no dilatation. On the other hand, a combination of morphin with codein, or of narcotin with papaverin, will produce a vasodilatation (Figs. 3, 4 and 5). It will be thus seen that in respect to the coronary arteries there seems to be a somewhat antagonistic action between morphin and codein on the one hand and narcotin and papaverin on the other.

In this place I may state that a similar effect has been noted by me on other vessels.

Sahli's combination of the total opium alkaloids was found to exert a very slight vasodilator action on the coronary.

The combinations recommended by Faust were also found to have very little influence on the coronary artery.

The first combination consists of morphin, 10 mg.; narcotin, 6 mg.; codein, 1 mg.; papaverin, 2 mg.; thebain, 0.5 mg., and narcein, 0.5 mg.

15. O'Connor: Arch. f. exper. Path. u. Pharmakol., 1911, lxvii, 195.
16. Voegtlin, Carl, and Macht, D. I.: Isolation of a New Vasoconstrictor Substance from the Blood and the Adrenal Cortex, THE JOURNAL A. M. A., Dec. 13, 1913, p. 2136.

The second combination consists of morphin, 10 mg.; narcotin, 2 mg.; codein, 1 mg.; papaverin, 0.1 mg.; thebain, 0.5 mg., and narcein, 0.1 mg.

These combinations were made up in the laboratory in the foregoing proportions from the purest alkaloids available.

II. Experiments on Excised Hearts

The advantage of the arterial ring method of studying the coronary circulation is of course the fact that it gives us the effect of the drug directly on the wall of the artery and the nerve elements in it, without interference by other factors. This very circumstance discloses, however, its chief disadvantage, namely, that it is more or less artificial, so that one is not quite warranted, without other corroborative evidence, in concluding that the same conditions hold good in the intact animal.

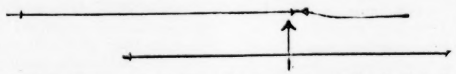


Fig. 7.—Human coronary from a female patient aged 27, who died of gastric ulcer and nephritis. Eight hours post mortem; showing relaxation produced by papaverin hydrochlorid, indicated by the arrow. Lower line is the reference line.

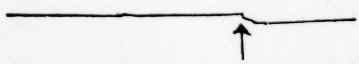


Fig. 8.—Pig's coronary. Stretching weight, 25 gm.; lifting weight, 12 gm., showing dilatation produced by papaverin plus caffein, indicated by arrow.

I have accordingly made a number of observations on the coronary outflow in intact but excised hearts. This method of studying the behavior of the coronaries is the oldest of all. Thus, Hedbom,[17] in 1899, by perfusion of the mammalian heart, concluded that caffein, atropin and quinin act as dilators of the coronary vessels. O. Loeb,[18] in 1903, used a similar method, but with different results; and Wiggers,[19] in 1909, used such a perfusion method for studying the action of epinephrin. On reviewing the work of these observers it is found that their conclusions are conflicting with each other, as the method is exposed to several sources of error.

A much better method has been recently described by the Russian pharmacologist Krafkoff,[20] and is the one used in the present work. The procedure is briefly the perfusion of the coronary artery directly by inserting a cannula into it, in the still surviving heart.

This method, while also extracorporeal, gives us the effect on the coronary artery *in situ*, and also on the longitudinal muscle fibers in its walls. The results agreed exactly with those found with arterial rings, as well be seen from Figure 6 and the protocols.

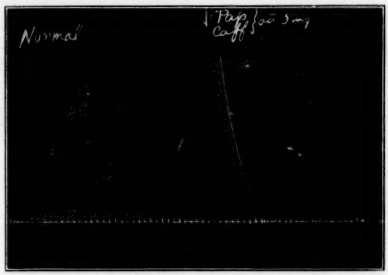


Fig. 9.—Cardiograph tracing of cat's heart. Up stroke, systole. Note increased contraction and toxicity after injection of papaverin plus caffein, of each, 5 mg.

Protocol 1.—Experiment: Perfusion of Pig's Coronary Artery by Krafkoff's Method.

A. Perfusion with normal Locke Solution. Rate of outflow: 11 drops per 30 seconds.

Perfusion with morphin sulphate, 0.02 per cent., in Locke solution. Rate of outflow: 19 drops per 30 seconds.

B. Perfusion with normal Locke solution. Rate of outflow: 7 drops per 30 seconds.

Perfusion with narcotin hydrochlorid, 0.02 per cent. solution, in Locke. Rate of outflow: 30 drops per 30 seconds.

C. Perfusion with normal Locke solution. Rate of outflow: 11 drops per 30 seconds.

Perfusion with 0.02 mixture of equal parts of morphin sulphate and narcotin hydrochlorid. Rate of outflow: 11 drops per 30 seconds.

III. Experiments on the Intact Animal

The behavior of alkaloids on arterial rings and on perfused mammalian hearts having been studied, it was very desirable to ascertain whether or not their action was the same in the intact animal with its heart *in situ* and its blood in circulation, for this would really approximate most to the behavior of the coronary circulation in chemical cases.

An attempt to do so was first made by François Frank[21] in 1903, who employed the method of instantaneous photography of the superficial arteries of the heart, and observed a marked dilatation following intratracheal insufflation of amyl nitrite.

Bond,[22] in 1910, studied the coronary circulation with the heart *in situ* by measuring the drop-flow of blood from a wounded coronary vein, before and after injection of drugs. The method is an excellent one, but had one chief drawback: In order to prevent clotting of the blood, Bond bled his animals to a great extent and replaced the blood with normal saline solution. Inasmuch as we know now that blood serum contains vasoconstricting and other substances which play an important rôle in the circulation, the conditions in his experiments were also abnormal.

In order to eliminate this source of error, I have studied the coronary circulation by a modification of Bond's method, namely, by rendering the blood of the animal incoagulable by means of herudin. The procedure was, briefly, as follows:

A cat was anesthetized with ether, its chest carefully opened and artificial respiration kept up. Through a cannula inserted in the jugular vein, herudin was injected. The pericardium was then opened and the animal suspended in the prone position or face downward. A small incision was then carefully made in the descending ramus of the left coronary vein. As the vein is very thin and contains very little contractile tissue, it is not necessary to insert a cannula to get a constant flow of blood. The drop flow of blood in the

17. Hedbom: Skand. Arch. f. Physiol., 1899, viii and ix.
18. Loeb, O.: Arch. f. exper. Path. u. Pharmakol., 1903, li, 64.
19. Wiggers: Am. Jour. Physiol., 1909, xxiv, 391.
20. Krafkoff: Arch. f. d. ges. Physiol. (Pflüger's), 1914, clvii, 501.
21. Frank, François: Compt. rend. Soc. de biol., 1903, lv, 1448.
22. Bond: Jour. Exper. Med., 1910, xii, 575.

herudinized animal was then noted and automatically registered, before and after injection of drugs. The results of these experiments agreed with the observations made by the other methods, as may be illustrated by the following protocol:

PROTOCOL 2.—Experiment, Dec. 22, 1914. Cat, weighing 2.5 kg., under ether anesthesia, was injected with 20 c.c. herudin. Normal outflow of blood: 10 to 12 drops per minute. Morphin sulphate, 4 mg., was injected. Flow of blood: 15 drops per minute. Ten minutes later 8 mg. of a mixture of morphin and narcotin were injected. Flow of blood: 11 drops per minute. Three minutes later, flow of blood: 8 drops per minute.

Eight mg. of papaverin hydrochlorid were then injected. Flow of blood increased from 8 drops to 18 drops per minute. Three minutes later flow of blood: 26 drops per minute.

While these experiments were in progress, it was interesting to find that two other observers, Morawitz and Zahn,[23] have recently also used herudin in studying the physiology of the coronary circulation. Their method was, however, a different one, namely, by clamping off an auricle and inserting a cannula into the coronary sinus, and they did not study the effect of opium alkalcids.

ACTION ON THE HUMAN CORONARY

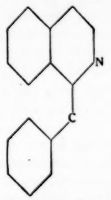
It was gratifying to find that the results of the observations on the coronary circulation in excised hearts and in the herudinized animals with their circulation intact were in complete agreement with those on excised arterial rings, for the ring method is the only one that can be applied to the human being. I called attention elsewhere[24] to the fact that the pulmonary artery of man when excised soon after death and kept in a suitable medium can be shown to be alive many days later. This holds true, though not to so great an extent, for the human coronary artery. I have succeeded in showing the dilator effect of papaverin, for instance, on the human coronary artery, as shown by Figure 7.

ANALYSIS AND COMMENT

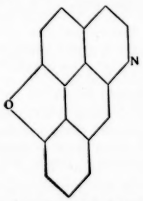
From the observations described above it will be seen that the various alkaloids of opium studied affect the coronary artery and coronary circulation differently. Morphin, the principal opium alkaloid, produces a mild relaxation or dilatation of the coronary artery and an increase in the coronary outflow; narcotin produces the same effect in a greater degree, and papaverin gives certainly the most marked vasodilating action of them all. On the other hand, the vasodilator effect of codein on the coronary is very slight, and that of narcein and thebain practically none at all. A most interesting phenomenon noted is the peculiar result of the synergism, or antagonism, as we might perhaps better call it, of morphin and narcotin. A combination of these two alkaloids instead of producing a vasodilatation, as might a priori be expected, produces practically no dilator effect at all. This is interesting in connection with the peculiar synergism of morphin and narcotin on respiration and other physiologic processes described by Straub, who worked with a combination of the two alkaloids. Strange to note, however, Straub from his writings seems to regard narcotin as a practically inert substance, and speaks of the morphin effect being enhanced, or to use his expression, "potentiated" by the addition of the inert narcotin. Such does not seem to be the case, judging from the present work. In my experiments, I have found that narcotin is by no means an inert drug, but is quite toxic to the heart, respiration and other physiologic functions. The effect of combining morphin and narcotin seems to be rather a true synergism in which the two components play equally important parts. To a lesser extent a similar synergism has been noted between morphin and papaverin, and codein and narcotin.

If we inquire into the chemical constitution of the opium alkaloids studied, we find that they are divided into two great classes.

On the one hand we have the papaverin class, to which papaverin, narcotin and narcein belong, and which is characterized by containing the benzyl—isoquinolin group.



On the other hand, we have the morphin class, to which morphin, codein and thebain belong, and which is characterized by containing the pyridin—phenanthrene group.



It would thus seem that the peculiar synergism just referred to is produced by a combination of members belonging to opposite chemical groups.

The commercial combinations of opium alkaloids of Straub and of Sahli were found to produce very little vasomotor change in the coronary circulation.

It is hardly necessary to declare that these differences in the behavior of the different alkaloids may be of practical importance. Thus, for instance, in cases of coronary spasm, which is regarded as the commonest cause of angina pectoris, an opiate possessing a marked vasodilator action would certainly be preferable. J. Pal of Vienna, who has worked a great deal with papaverin, has actually recommended and employed that drug in angina pectoris[25] and other conditions with vascular spasm.[26] In choosing a suitable drug, other factors are, however, to be borne in mind. The principal other factors to be considered in the case of an opiate are its narcotic and analgesic action, its effect on the respiratory center, and its effect on the heart.

In respect to narcosis and analgesia of the six alkaloids studied, narcein and thebain fall out of consideration. These alkaloids, though derived from opium, have no sedative action. Indeed, thebain is a convul-

23. Morawitz and Zahn: Deutsch. Arch. f. klin. Med., 1914, cxvi, 364.
24. Macht: Jour. Pharmacol. and Exper. Therap., 1914, vi, 13.
25. Pal, J.: Deutsch. med. Wchnschr., 1913, p. 2068.
26. Pal, J.: Wien. med. Wchnschr., 1913, No. 39.

sant much like strychnin, and narcein has also an exciting rather than sedative influence on the central nervous system. Narcotin also has very little effect on pain. Of the three other alkaloids remaining, the narcotic and analgesic properties of morphin and codein are too well known to need reiteration. It is not generally known, however, that papaverin is quite an efficient drug in this respect, though attention was called to that effect by Baxt[27] as early as 1869.

I have made a few observations as to the effect of papaverin on pain in patients in the outpatient department of the Johns Hopkins Hospital, and although the number of cases so far is very limited, the results in quieting acute pains of various kinds—gall-stone colic, acute gastritis, stenocardia, lumbago, etc.—were very satisfactory.

In regard to action on the respiratory center of the three drugs, morphin, codein and papaverin, the morphin is certainly the most depressant. A fuller study of respiration is now being carried on, and in this place I will state only that papaverin is much less depressant than morphin in this respect, and codein still less so.

As to the action on the heart, it may be also stated in this connection that narcotin has the most toxic action of the alkaloids studied; and morphin, though not very poisonous, is in full doses depressant to the heart. Codein and papaverin, on the other hand, were found to have no depressant action in this respect, and in small doses were found actually to stimulate cardiac activity. More complete data on this subject are to be published later.

COMBINATION OF THE OPIUM ALKALOIDS WITH CAFFEIN

Inasmuch as all opium alkaloids in excessive quantities are depressant to the heart, and inasmuch as caffein is one of the chief pharmacologic antidotes to opium and is at the same time a cardiac stimulant, it was of interest to learn the action of a combination of caffein and some of the alkaloids studied. Accordingly, some experiments along these lines were made.

It was found that caffein alone dilates the coronary artery, and that this action is not antagonized by the opium alkaloids. Thus a combination of papaverin and caffein gave a dilatation of the coronary ring (Fig. 8).

In respect to the cardiac effect, it was found that caffein, given simultaneously with an opiate, produced cardiac stimulation and counteracted any cardiac depression that might otherwise have occurred (Fig. 9).

CONCLUSIONS

1. Of the principal opium alkaloids, some affect the coronary circulation markedly, others slightly, and still others not at all.

2. Morphin produces a mild dilatation of the coronary, codein a very slight one, narcotin and papaverin, a very marked one, and narcein and thebain none at all.

3. A combination of morphin and narcotin produces a much lesser relaxation of the coronary artery than that produced by each of them individually.

4. This action of the opium alkaloids has been studied in three different ways and probably holds good in the clinic.

5. It is hoped that these observations may conduce to a more rational therapy of cardiac conditions.

27. Baxt: Arch. f. Anat. u. Physiol., 1869, p. 112.

INTRASPINAL ADMINISTRATION OF MORPHIN *

HUGH McGUIGAN, M.D., PH.D.
AND
E. L. ROSS, PH.D.
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The object of this preliminary note is to call attention to the pronounced and unexpected action of morphin when injected into the cerebrospinal canal or directly into any part of the central nervous system.

In clinical work the physician expects of this drug only a sedative, quieting and pain-relieving action. It perhaps rarely enters his mind that, depending on the mode of administration or rather the place of administration, it may have an entirely opposite effect.

It is well known to laboratory workers that, after large doses of morphin, frogs develop a tetanus much resembling that produced by the action of strychnin. Most text-books on pharmacology, however, mention the difficulty of obtaining this action in mammals except by special means. It is the object of this note to tell how this may be obtained easily and to prevent its probable development when least desired.

McGuigan and Becht have shown that when strychnin is injected directly into the spinal cord or brain ventricles, a localized segmental action is quickly developed. Knowing that the action of morphin on the cord is in some respects similar to that of strychnin, we tried the intraspinal injection of morphin and found an unexpected action. Since it is a rather common mode of drug administration, we wish to advise care in the use of drugs by this method. An example will suffice at this time. In this typical experiment we have used about an average dose for a dog if the drug had been given subcutaneously. It certainly would not have been fatal if so administered, and would have elicited a profound sedative action.

A young female fox terrier in good health, weight 6½ kg., was slightly narcotized with ether and a needle inserted above the fourth ventricle. Clear cerebrospinal fluid escaped. There was no disturbance of respiration.

At 9:35, 0.5 c.c. of a 3 per cent. morphin sulphate solution was injected and the ether removed.

At 9:50 a slight rhythmic twitching and jerking of all four legs occurred, at the rate of 200 per minute; the jerk of the hind limbs following that of the front by about one-tenth of a second.

9:55: A slight blast of air or any mechanical stimulus starts scratching movements with all limbs. The pupils are widely dilated.

10:00: Repeated scratching movements occur as if to remove an irritation from the nose and abdomen. There has been a moderate movement of the bowels. (There is never vomiting when morphin is administered in this way.) The animal is somewhat delirious. There is considerable yelping and some incoordination. Respiration is stimulated and the heart beat is about 180 per minute.

10:15: The dog is wild and acts like a rabid animal. A thick, ropy foamy saliva, not profuse, fills the mouth. The legs are stiff and claws contracted. Partial paralysis of limbs, especially of flexors, is present. Extreme pilomotor effect along spine, wider over shoulders, is seen.

10:30: The animal goes into a strong spasm.

11:02: Strong spasm; as strong as usually seen under strychnin.

11:16: Very strong spasm, in which the animal dies. The characteristics of these spasms are: They commence with a

* From the Department of Pharmacology, Northwestern University Medical School.

fine twitching tremor of the muscles around the nostrils; swallowing and asphyxia-like movements of respiratory muscles, perhaps some increase in the saliva. The head bends forward strongly on the chest, the muscles of the neck are rigid; the front legs are extended toward the abdomen; the hind legs are in continuous stiff scratching movements toward the abdomen; the tail is tight between the legs and the back is arched. Usually the animal twists into a pleurothotonus and gradually into a typical strychnin opisthotonus. In this case the tetanus lasted about a minute and after a few intermittent jerks the animal died in opisthotonus. As a rule, at least with larger doses, respiration stops before the heart. In this case, it was impossible to decide which stopped first.

There is some slight variation in the symptoms, depending on the part into which the morphin is injected. If injected in the lumbar region, the action develops first in that region, but it always causes increased reflexes and tetanus. Codein and apocodein apparently are inactive. The action of varying doses and the cause of the tetanus will be discussed later.

A UNIQUE FOREIGN BODY IN THE URINARY BLADDER

GEORGE DE TARNOWSKY, M.D., CHICAGO

While self-introduction of foreign bodies into the urethra by children out of pure curiosity, and by sexual perverts for the gratification of abnormal libido-sexualis is not uncommon, the following case presents features so unique as to warrant brief report.

CASE 551,066.—J. C., unmarried, aged 36, was admitted to my service at the Cook County Hospital, Oct. 10, 1914, with the general complaint of pain in the lower abdomen and dysuria. The patient was a Polish laborer of low-grade mentality, speaking no English and only a little broken German, in addition to his own native dialect, which was uninterpretable. After many attempts, the following history was obtained and corroborated:

May 15, 1914, over five months before admission, he was working on a new building as a helper. Several roofers were busy putting a tar coating on the roof. During the lunch hour these men decided to have some fun at the expense of their fellow workman, towards whom they nevertheless felt no animosity. They laid him down on one of the floors, uncovered his person and forcibly pushed long thin pieces of solid tar, which one of the men had previously rolled into the size and shape of a urethral suppository, into his urethra. After his tormentors had released him, the patient, although in agony, was able to remove the last piece of tar injected, as it was protruding beyond the glans. From that time on he complained of pain in the lower abdomen and of marked dysuria. He had been forced to urinate every half hour during the day and only slightly less frequently during the night. The stream was very small, usually dribbling, with blood at the end of micturition. At various intervals he had chills and fever. His previous history was negative, with the exception of an injury to the head seven years previously, which may be responsible for his present somewhat impaired mentality.

Examination.—The patient, a well-nourished man, appears quite sick and walks around in a stooping position; complains of pain in the lower portion of abdomen. Head and thorax negative. Lower abdomen in median line tender on palpation; no tumor-mass discernible. Extreme pain on pressure over penis, beyond the peno-scrotal angle; prostate very tender on palpation.

Urinalysis, Oct. 21, 1914, showed a specific gravity of 1.026, the urine being cloudy, acid (?), with a foul odor, a trace of albumin, and showing the presence of hyaline casts, epithelial cells and leukocytes.

Cystoscopy, Oct. 22, 1914, by Dr. Euston, "shows a very severe acute cystitis. Bladder holds very little fluid and on account of the exudate and the acuteness of the cystitis, no further examination was made for foreign bodies."

The patient's temperature, pulse and respirations were normal on admission and remained normal after the cystoscopy.

Treatment and Result.—He was placed on a light diet, and his bladder was irrigated twice weekly with silver nitrate, boric acid or potassium permanganate solutions. Urinalysis, Nov. 29, 1914; specific gravity 1.022, acid, clear straw color, normal odor, no albumin, blood or casts. From this time on, patient made few if any complaints, became a helper in the ward and was practically forgotten as a patient, his story of the tar injection being discredited.

Urinalysis, Dec. 19, 1914; specific gravity 1.032, red-brown color, strongly ammoniacal odor, alkaline reaction, blood present (guaic test), albumin (?), no sugar, many mucous cells, triple phosphates and bacteria present. Urinalysis, Dec. 23, 1914; specific gravity 1.028, cloudy, reddish color, alkaline, strongly ammoniacal odor, albumin present. Microscopically: granular casts, mucus and epithelial cells and white blood corpuscles were present in large quantities. The records of the last two examinations were mislaid and not reported on at the time.

Feb. 20, 1915, patient presented himself for examination, complaining of chilly sensations and severe pain in the lower abdomen. His temperature was 101.4, pulse 90, respirations 24. On the following day his temperature had risen to 102.6. In order to settle the question of a foreign body in the bladder, he was sent to the Roentgen-ray department for examination. The report stated that "there was a shadow present in the bladder which may indicate stone."

Operation.—Feb. 24, 1915, the patient's temperature, pulse and respirations had again dropped to normal, and a suprapubic cystotomy was performed. Bladder distention was found to be impossible, not over two ounces of fluid being retained per catheter. On this account, after separating the recti muscles, a small incision was cautiously made one-half inch above the symphysis. To my chagrin, even this low incision caused me to enter the peritoneal cavity. The opening was immediately closed with catgut. A second incision, well behind the symphysis was made in an upward, inward direction. An enormous hypertrophy of the bladder wall was encountered, its anterior surface being fully three-fourths of an inch thick. The bladder mucosa presented the picture of a chronic cystitis.

A mushroom-like solid mass, of the consistence of putty, partially covered with calcareous deposits, was found in the bladder, its stem being embedded in the prostatic urethra for a distance of a third of an inch. It was so firmly adherent to the urethra that it broke in several pieces while being removed. After a thorough irrigation of the bladder, the incision was closed, leaving a small suprapubic drain and a retention catheter. The specimen, when pieced together, was the size of an English walnut and weighed 24 gm. The calcareous deposits were chiefly calcium oxalates and urates. The mass itself was black, viscid, very slightly soluble in water, readily soluble in alcohol and ether. On burning it gave off the very characteristic odor of tar. No tests were made for the more complex constituents of tar, such as creosote, etc.

Barring a slight attack of bronchopneumonia the patient made an uneventful recovery. At present, twenty-five days after the operation, the incision has practically closed and patient is urinating freely through his urethra.

30 North Michigan Boulevard.

Relation of the Death Rate and the Tax Rate.—Many recognize that the death rate and the tax rate have a positive relation to each other, and that health is the first requisite in the progress and happiness of a people. When this is more generally appreciated it will not be a difficult task to secure the necessary material and support, be it public or private, individual or organized, to maintain a higher standard of public health.—Homer C. Brown, *Monthly Bulletin, Ohio State Board of Health.*

Special Article

PRACTICAL PHARMACOLOGY

(Continued from page 1399)

XVII

DRUGS WHICH STIMULATE SYMPATHETIC ENDINGS

Ergot

Various grains are invaded by a fungus known as ergot; that growing on rye and replacing its grain is the official ergot. In damp seasons this fungus may constitute as much as 10 per cent. of the flour made from the rye, and the bread made from such flour is poisonous, giving rise to a condition known as ergotism. The symptoms are of two general types, in one of which convulsions are the predominant feature, and in the other gangrene. The two types are not sharply separated, and both types are usually seen in epidemics of ergotism. Such epidemics are now uncommon, but they still occur occasionally.

Premature delivery and abortion were frequently observed during epidemics of ergotism, and this probably led to the use of ergot in obstetrics. Ergotism, however, does not always prevent the normal progress of labor.

The marked differences observed in the general types of poisoning suggest strongly that ergot differs widely in its constituents at different times, and this has been shown to be the case. Ergot has proved an unsatisfactory drug at best for the clinician, while its chemistry has presented many difficulties for the investigator.

It has been claimed on many occasions that the active principle of ergot had been discovered, but experience has shown invariably that the supposed active principle represented at most a part of the activities of the drug, and often an insignificant part.

This much is certain, that ergot contains a number of active principles, some of them present in minute quantities, but having extraordinary activity, and there are at least four constitutents which deserve mention. These are ergotoxin and ergotinin, two alkaloids which are closely related, and two principles commonly considered as putrefactive principles, because they are present in putrefying meat; these are tyramin, or hydroxy-phenyl-ethyl amin and histamin, or beta-iminazolyl-ethyl-amin.

Ergotoxin, an extremely active alkaloid, is the hydrate of ergotinin, which is inactive, but which is probably changed into ergotoxin under conditions which are not very well understood. Ergotinin has been known since 1875; ergotoxin, only recently discovered in pure form, constitutes the active portion of various substances which have been isolated in greater or less degree of purity by various investigators and given different names.

Ergotoxin stimulates those sympathetic endings which have motor functions, and in large doses paralyzes them; the endings of those fibers which are concerned with inhibition are not affected by ergotoxin. Here again we have an example of a drug acting on whole groups of nerve-endings which have similar functions; this results in constriction of the blood-vessels, with rise of blood-pressure, and in contraction of those smooth muscles which contract in response to stimulation of the sympathetic. It will be seen that ergotoxin resembles the action of epinephrin so far as the latter acts on the motor nerve endings, or myoneural junctions of the sympathetic, while it differs from epinephrin in that the latter also stimulates the myoneural junctions of the sympathetic which are concerned in inhibition, while ergotoxin does not.

As stated previously, in the discussion on epinephrin, the pregnant human uterus responds to sympathetic stimulation by contraction. It also responds to ergotoxin by contraction, and this serves to explain why ergot sometimes causes abortion, and also why accidents occur so frequently when ergot is used to empty the pregnant uterus, since overstimulation of the sympathetic results in tonic contraction instead of the normal peristaltic waves which are present in normal childbirth.

This tonic contraction, being desired after delivery of the placenta, also indicates the use of ergot at that stage of labor.

The uterus is more susceptible to the action of ergotoxin and epinephrin at this period than during the non-pregnant state; hence ergotoxin, like epinephrin, causes active uterine contraction with doses which have little effect on the general blood-pressure. Tonic contraction is the normal physiologic condition of the uterus after delivery of the placenta, and it is only natural that stimulation of the sympathetic would have a more pronounced action at this stage than at a time when tonic contraction would be an abnormal condition, for it is a fairly general rule that drugs influence structures more actively in the direction of their normal functions than in opposition to them.

Ergotoxin also acts on other smooth muscle which is innervated by the sympathetic, but these actions do not require discussion here.

Ergotinin, being inactive, does not require further discussion except to state that it may be converted into ergotoxin by hydration.

Tyramin, or hydroxy-phenyl-ethyl-amin, resembles epinephrin in its chemical constitution and its pharmacologic actions. It is formed from tyrosin during putrefaction, from which circumstance it received the name "tyramin." It probably constitutes the chief constituent of aqueous preparations of ergot, ergotoxin being insoluble in water. It causes active contraction of the pregnant uterus.

Histamin may be derived from histidin; it is said to be present in ergot in amounts too small to influence the uterine action of the latter to any marked extent. It is so extraordinarily active on the uterus, however, that it is difficult to believe that it is without importance, though it may escape isolation in amounts that can be utilized profitably. It can be prepared synthetically, and may be obtained commercially, should further investigation indicate it has special value. It is said to cause a perceptible contraction of the uterus when that organ is perfused with a solution containing one part of the histamin in 200,000,000 parts of Ringer's solution.

It causes constriction of some vessels, but dilatation of others, the effect of its intravenous injection being a fall of blood-pressure.

In addition to the four constituents which have been discussed, ergot also contains saponin, which may

* This is the seventeenth of a series of articles on useful drugs—on practical pharmacology for the general practitioner. As soon as completed, these articles, elaborated by additional subjects, will be published in book form.

be of some importance when preparations of ergot are injected intravenously, but which is of little or none when these are used orally. In addition, there are present minute amounts of various substances which have not been isolated in pure form.

It seems probable that all of the pharmaceutical preparations of ergot, both aqueous and alcoholic, which have decided therapeutic activity, contain either tyramin or ergotoxin, or both, and while the older nomenclature is confusing and should not be employed in prescribing, the following tabulation will show the relationship between some of these preparations and the active principles known to exist in ergot, as given by Barger and Dale:

Ecbolin and ergotin (Wenzell) mixtures of alkaloids, containing cholin (Meulenhoff).
Sphacelinic acid (Kobert): inactive resin with adherent alkaloid.
Cornutin (Kobert): an alkaloidal resin, probably containing some ergotoxin, and also some other active substance which may be a decomposition product of ergotoxin.
Cornutin (Keller): impure mixture of ergotinin with ergotoxin.
Chrysotoxin (Jacobi): inactive yellow coloring-matter with a small proportion of adherent alkaloid.
Secalintoxin (Jacobi): mixture of ergotoxin and ergotinin.
Sphaeclotoxin (Jacobi): impure ergotoxin.
Hydroergotinin (Kraft): recent synonym for ergotoxin.

The foregoing tabulation may serve to suggest the unwisdom of prescribing every new preparation which appears with the claim that it represents the parent drug in a new and improved form. Among the numerous proprietary preparations which have been brought forward in recent years as substitutes for ergot is clavin, which was widely advertised for a time, and which has been shown to be a mixture of leucin and aspartic acid, and to be devoid of pharmacologic or therapeutic action.

Unfortunately there is no agreement as to the exact pharmacologic action desired in many cases when ergot is used; hence it is impossible to determine which of the several active principles should be used in its place in those cases.

Ergot exerts a marked effect on the central nervous system, the convulsions being due to this action, but this has not been studied sufficiently to make its consideration profitable. The depression which toxic doses induce in the cock is due apparently to the action on the cerebrum; the ataxia to action on the cerebellum, and the clonic type of convulsions, suggest that the medulla is the seat of this action.

The vagus center in the medulla is also stimulated, and the emesis which sometimes results appears to be due to a central action.

The most striking effect of the injection of ergot in the cock is the gangrene of the comb and wattles which it induces. Ergot gangrene in man commonly affects the extremities. Many explanations have been offered to account for the phenomenon; but it can be said with certainty only that ergot exerts some peculiar action resulting in active contraction of the vessels (probably due to the ergotoxin and the tyramin) and that this is attended with stasis and hyaline thrombosis, with the resulting gangrene. Certain animals are much more susceptible to the gangrene action than others, the chicken, the pig and man being among those which are readily affected.

When fluidextract of ergot is injected directly into the veins it causes a slight and temporary fall of blood-pressure, followed by a brief rise, and then return to normal. The fall in pressure is due apparently to saponin and does not occur after the oral administration of ergot, because saponins are not absorbed rapidly, if at all, from the gastro-intestinal tract.

Small doses of ergot cause rhythmic contractions of the pregnant uterus, while large doses cause tonic contractions. Unfortunately, it is impossible to stimulate the rhythmic contractions by ergot without risk of inducing the tonic also; hence the danger of using ergot before the uterus has been emptied.

Ergot varies quantitatively, as well as qualitatively, in its actions, deterioration being quite rapid according to the general belief, but we have no biologic test which will indicate the therapeutic activity quantitatively; hence it is impossible to say how rapid the deterioration really is. One investigator estimated that ergot was but one-eighth as active after one year as at the time of being collected, and the Pharmacopeia directs that it shall not be kept for more than one year. The liquid preparations of ergot deteriorate also, but their rate of deterioration appears to be far more variable than is that of the crude drug. Preparations made with diluted alcohol and kept without exposure to the air keep fairly well.

The want of a chemical test for the activity of ergot has led to the introduction of various biologic methods of standardization; the most generally useful of these is probably that which consists in determining the amount of ergot required to cause gangrene of the comb. The action on the uterus of the virgin guinea-pig would appear to have the advantage of testing the therapeutic activity on the organ for which the ergot is used therapeutically, but this test yields no more satisfactory results than does that on the cock's comb.

The principle or principles which induce gangrene appear to deteriorate more rapidly than does that which acts on the uterus, and the test is therefore more suitable for fresh specimens than for old ones.

Acute poisoning with ergot is rare, if one does not include the untoward action on the uterus, but occasionally overdoses give rise to gastro-intestinal disturbances, convulsions and later to gangrene. There is no specific antidotal treatment for ergot poisoning, and one can only combat the symptoms as they arise.

THERAPEUTIC USES

Few drugs have been used in a greater variety of conditions than ergot, often where opposite effects are required; for example, in shock to increase blood-pressure, and in hemorrhage, where an increase in blood-pressure is contra-indicated.

It was formerly used extensively to hasten the expulsion of the fetus in normal labor, but one can never be certain of securing the increased rhythmic contractions and avoiding the tonic which prove so dangerous. Ergot should be used in labor only after the uterus has been emptied, to prevent or control post-partum hemorrhages. If used before the fetus or the placenta is expelled, only the smallest therapeutic dose should be employed, and this should not be repeated even if no effect is perceptible. This use, however, is strongly contra-indicated.

Ergot is used for excessive menstrual flow, and because it is useful in this condition it has been assumed that it would be equally useful in uterine hemorrhage from other causes, including that due to tumors, but there is no reason to expect favorable results in such cases.

There seems to be no sufficient reason for the continued use of ergot in any chronic condition, as it is liable to cause poisoning.

While ergot is capable of increasing the blood-pressure to a certain extent, it is inferior to epinephrin in this respect, and it is not sufficiently dependable for use in shock.

The other purposes for which ergot has been recommended do not appear to merit discussion.

DOSAGE

Ergot is commonly administered in the form of the fluidextract, which may be given by the mouth or injected intramuscularly—not subcutaneously, because of the pain which the last-named method involves. The action after oral administration is usually delayed for about twenty minutes; hence the intramuscular injection is preferable when post-partum hemorrhage is to be feared.

Not exceeding 2 c.c. (30 minims) of an active fluidextract of ergot should be administered before the expulsion of the fetus, but, as previously stated, even this is not recommended. This dose given after delivery of the placenta may be repeated if necessary after fifteen minutes. The dose required will depend largely on the activity of the specimen at hand, but it is better to have a reliable specimen always at hand for emergencies.

MATERIA MEDICA

Ergota.—Ergot, U. S. P.

In Continental pharmacopeias this drug is generally known as "secale cornutum." It is officially described as the dried sclerotium of *Claviceps purpurea*, replacing the grain of rye. The drug as it occurs in commerce is derived chiefly from Spain and Russia, though other countries, notably Germany, Austria and Sweden occasionally furnish supplies of good ergot. Spanish ergot is larger than the Russian variety, but is said to contain less ergotinin, which may be converted into the active ergotoxin.

Ergot deteriorates rapidly when kept in open vessels and in a damp atmosphere. This is particularly true of the powdered drug. The Brussels Conference Protocol and foreign pharmacopeias generally direct that ergot should not be more than one year old, and should be preserved entire. The powder when called for on prescriptions should be prepared extemporaneously at the time it is wanted.

This drug is still frequently administered in the form of powder in doses of 1 to 2 gm. (15 to 30 grains) in the form either of capsules or cachets. It is more frequently administered in the form of:

Fluidextractum Ergotae.—Fluidextract of Ergot, U. S. P.

Generally described in European countries as "extractum secalis cornuti fluidum." This preparation is a hydro-alcoholic, slightly acid liquid, having a reddish-brown color and a characteristic rather unpleasant odor. It is readily miscible with water, but precipitates slightly when mixed with an equal volume of strong alcohol. Considerable difficulty has been experienced in securing reliable and reasonably permanent fluidextracts of other extractive preparations of ergot. Recent observations appear to indicate that samples of the fluidextract preserved in small vials or hermetically sealed tubes keep better than similar preparations exposed to the air, and the product at the present time is frequently dispensed in sealed vials or tubes containing not more than from one to four doses.

Efforts to prepare purified extracts of ergot for hypodermic use or to isolate the active principles in water-soluble form have met with some success, and several preparations of this type now available are described in New and Nonofficial Remedies.

HYDRASTIS

This drug, its chief alkaloid, hydrastin, and hydrastinin, which is derived from hydrastin artificially, are often classified with the morphin group, but they act on the central nervous system much like strychnin. On the other hand, they are often used therapeutically for their effects on the uterus: hence it is convenient to consider them here.

Hydrastis contains berberin and another unimportant alkaloid, canadin, in addition to hydrastin. The berberin probably has no especial value, but it is sometimes used for its bitter effects.

Hydrastin stimulates the central nervous system, overdoses causing hyperexcitability of the cord. Very large doses may cause strychnin-like convulsions. Moderate doses cause a rise of blood-pressure, probably through constriction of the arterioles; the mechanism of this is in some doubt, and its therapeutic importance has been greatly exaggerated. Toxic doses cause depression of the respiratory center and a fall of blood-pressure, with cardiac depression.

Hydrastis and hydrastin induce uterine contractions which may be peristaltic in character or they become tetanic: hence they are used to prevent excessive menstrual flow or uterine bleeding from other causes except post-partum hemorrhages, in which they are said to be much less effective than ergot. They are sometimes used in subinvolution of the uterus. It is possible that their tendency to cause a rise of blood-pressure may interfere with their therapeutic usefulness in arresting uterine hemorrhage.

They are commonly credited with some special tonic action on mucous membranes, and have been widely used, largely in the form of proprietary preparations, as applications to the nose, throat, urethra and vagina in chronic catarrhal conditions.

Hydrastinin has been obtained from hydrastin by oxidation and is now being made synthetically from other products. It acts locally and centrally to induce vasoconstriction, and at the same time it is said not to depress the heart; hence the general blood-pressure rises when it is injected. It is said to be better than hydrastin for checking uterine hemorrhage from various causes. It is sometimes used in solution for local application to various mucous surfaces to check hemorrhage. Its action on the uterus is much like that of hydrastin.

There is no very clear indication for the therapeutic employment of hydrastis and its alkaloids. Hydrastinin would seem to have the advantage over hydrastis and hydrastin in nearly every case except those in which hydrastis is used as a bitter.

DOSAGE

The average dose of the fluidextract of hydrastis is 2 c.c. (30 minims); smaller doses may be used for the bitter effect; the dose of hydrastin or hydrastin hydrochlorid is 0.01 gm. (1/6 grain); that of hydrastinin is 0.03 gm. (½ grain).

MATERIA MEDICA

Hydrastis and its alkaloids afford an illustration of the way in which drugs of little therapeutic value attain wide popularity in the treatment of a variety of conditions. These agents have a great diversity of actions on the central nervous system, on the heart

and vascular system and on mucous membranes. The proprietary preparations containing them have been lauded in many clinical conditions regardless of the fact that we have better drugs for nearly all of these conditions.

Hydrastis.—Hydrastis, U. S. P.

The dried rhizome and roots of *Hydrastis canadensis,* yielding by the process given in the U. S. P. not less than 2.5 per cent. of hydrastin. Hydrastis also contains about 3 per cent. of berberin and a minute quantity of canadin. The drug is used principally in the form of:

Fluidextractum Hydrastis. — Fluidextract of Hydrastis, U. S. P.

A solution of the soluble constituents of hydrastis in a mixture of glycerin, alcohol and water. One hundred c.c. should contain 2 gm. of hydrastin in addition to the other alkaloids of hydrastis.

Of the naturally occurring alkaloids of hydrastis only one is at all widely used. This is official as:

Hydrastina.—Hydrastin, U. S. P.

Because this alkaloid is almost insoluble in water, it is preferably used in the form of hydrastin hydrochlorid. It is hygroscopic and must therefore be kept in well-closed glass bottles.

Hydrastininae Hydrochloridum. — Hydrastinin Hydrochlorid, U. S. P.

An artificial alkaloid derived from hydrastin or made synthetically. It occurs as white or faintly yellowish crystals having an intensely bitter taste. It is very soluble (1:1) in water and freely soluble (1:3) in alcohol.

EMMENAGOGUES

The drugs intended to stimulate the menstrual flow were formerly treated at some length in text-books of therapeutics under the heading given above, but all of the emmenagogues have other actions on which their therapeutic use depends and they do not form a well-defined pharmacologic or therapeutic group.

Menstruation is attended with uterine congestion and is disturbed or prevented by numerous causes which interfere with the uterine circulation or with the general health. Hence emmenagogues may be classified as (1) measures intended to improve the general health; (2) measures or agents which promote uterine congestion.

Iron, strychnin and cod liver oil are frequently classified as emmenagogues which act by improving the general health, but it is obvious that this class must be nearly coextensive with the materia medica.

Among the measures intended to promote the uterine circulation are hot baths and irritants of the colon and of the genito-urinary tract.

Hot baths do not require detailed discussion in this place; the mechanism by which irritants of the colon, such as aloes and other evacuants of the anthracene group, cause uterine congestion has been discussed; various volatile oils and other irritants which are excreted by the kidneys serve as irritants to the genito-urinary tract and induce uterine congestion, but their use is now limited almost entirely to users of patent medicine and mixtures intended to induce abortion.

These mixtures are usually fraudulent and seldom contain active constituents in dangerous amounts. Indirectly the sale and use of such nostrums has resulted in many fatalities due to the ingestion of dangerously large doses of volatile oils or of drugs containing them.

It is obvious from the foregoing discussion that the emmenagogues do not call for detailed discussion under this heading.

Valerian and viburnum may be discussed in this place.

Valerian is now believed to be useful in attacks of nervousness and hysteria by a psychic stimulation resulting from its disagreeable odor.

Viburnum prunifolium was formerly credited with the power to avert threatened abortion and to exert a favorable influence on menorrhagia. Reports sustaining these views have appeared in the literature, but the experience of most physicians fails to justify a belief in the qualities claimed for this drug. Viburnum contains small amounts of a volatile oil with a disagreeable odor and may act like valerian reflexly through the sense of smell.[1]

DOSAGE

Valerian is commonly administered in the form of the ammoniated tincture, in doses of 2 c.c. (30 minims), and viburnum is used in the form of the fluidextract in like amounts.

Valeriana.—Valerian, U. S. P.

The dried rhizome and roots of *Valeriana officinalis.*

Tincture Valeriana Ammoniata. — Ammoniated Tincture of Valerian, U. S. P.

One hundred c.c. represent the soluble constituents of 20 gm. of valerian in aromatic spirit of ammonia.

Viburnum Prunifolium. — Viburnum Prunifolium, U. S. P.

The dried bark of the root of Viburnum prunifolium.

Fluidextractum Viburni Prunifolii.—Fluidextract of Viburnum Prunifolium, U. S. P.

One hundred c.c. represent the soluble constituents of 100 gm. of viburnum prunifolium in a menstruum containing approximately 60 per cent. of alcohol.

It is probable that viburnum prunifolium continues to maintain a certain degree of popularity because of extravagant claims made in advertisements in reputable medical journals by the manufacturers of various proprietary preparations such as Hayden's Viburnum Compound and Dioviburnia. The advertising creates a certain demand for these preparations and the continued demand for them serves as a stimulus to pharmaceutic manufacturers to market more or less similar compounds for those who do not care to use the proprietary preparations, a sort of vicious circle of exploitation and demand being thus established.

It seems probable that the ammoniated tincture of valerian will serve any purpose that the more expensive proprietaries may.

1. The literature of these two drugs affords an example of the unsatisfactory conditions that obtain with reference to many articles in the materia medica as the result of the blind following of those who blindly copy others equally blind. Many text-books state or imply that the actions of valerian and viburnum are practically alike, but they also state that they are used therapeutically for unlike conditions. Thus valerian is commonly used for the relief of hysteria, while viburnum is often employed as a uterine sedative in painful and excessive menstruation and kindred conditions, but no explanation is offered for this difference in their application.. One is almost forced to the conclusion that very little discrimination has been shown in the use of these drugs, and while accumulated clinical experience would *seem* to show that valerian has at least a limited field of usefulness, there is no apparent reason to retain viburnum in the materia medica in the absence of evidence that it has therapeutic value, and it would seem wiser to substitute valerianic acid for either of them in a given case. As a matter of fact, the subject requires investigation.

Prevention.—Ventilate; you who want health; ventilate. —*Buffalo Sanitary Bull.*

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DIET AND THE INTESTINAL BACTERIA

The conviction is growing among students of the processes which go on in the alimentary tract that the micro-organisms which inhabit it are noticeably responsive to changes in the character of the diet. There are many clinical indications that a pronounced alteration in the chemical make-up of the ration is followed promptly by a change in the intestinal flora. The free use of carbohydrates in infant feeding, for example, is not infrequently attended with an alteration in the consistency of the feces indicative of pronounced fermentative changes which speedily disappear after a return to a milk diet restricted in respect to carbohydrates. Although it was long suspected that alterations in the bacterial flora accompany such changes in feeding, it remained for Herter and Kendall,[1] among the first to examine this problem with suitable modern methods, to attempt to determine the precise effects on the nature of the microbial life that may arise from definite and abrupt variations in the chemical composition of the food. These American investigators asked themselves whether it is possible to establish quite definite and unmistakable concomitant variations in food and bacteria. They realized what is likely to suggest itself to every thoughtful reader, that the establishment of such variations, under physiologic conditions, must be an essential condition for the discovery of exact indications for a suitable regimen under states of infection in the intestine.

In order to secure decisive results, Herter and Kendall studied the fecal bacteria which are found under extreme dietary conditions so that the alternations should be as abrupt as possible and little chance would be afforded for gradual adaptations to a given type of ration. By this method it was observed, in animals, that changes from a dominantly protein dietary, abounding in meat and eggs, to a milk and sugar regimen is actually followed by a pronounced modification in the nature of the flora as well as in the putrefactive products of the feces and urine and in the clinical conditions. The chief characteristic of the bacterial change was the gradual but rapid substitution of an acidophilic, non-proteolyzing type of flora for a strongly proteolyzing type which predominates with the rich protein intake. Similar results indicative of a simplification of the intestinal flora so that Gram-positive bacteria of the acidophilus and bifidus groups preponderate and the organisms of the colon type are reduced in number have been observed in other cases.[2]

To what extent changes of the sort here outlined arise in man has remained largely a matter of conjecture. The first serious attempt, so far as we are aware, to correlate conditions and changes in the fecal flora of human subjects with exact data in regard to the constitution of the diet employed have been undertaken by J. C. Torrey[3] in the Department of Experimental Pathology at the Cornell University Medical College, New York City. He was fortunate in securing as subjects for this investigation typhoid patients under the care of Coleman and placed on his now well-known "high-calory" diet[4] in order to reduce to a minimum the severe loss of nitrogen and weight which otherwise usually occurs in this disease. The examination of the stools early in the course of the disease indicated that the intestinal flora in such patients is not uniform or specific in type, but exhibits variations that may be observed in a series of supposedly normal individuals. From this it appears that the character of the intestinal flora is not a factor concerned in the determination of susceptibility to typhoidal infection.

On a diet consisting of a daily average of from 50 to 100 gm. of protein, 75 to 100 gm. of fat, and 250 to 300 gm. of carbohydrate including milk sugar, Torrey reports that the intestinal flora tended to become simplified in regard to the variety of bacterial types observed. There is a decided tendency for the development of a fermentative type, with *Bacillus acidophilus* as the dominant organism. The degree of this transformation was dependent largely on the type of flora which was present at the onset of the disease. When the flora showed a definite putrefactive tendency, the change initiated by the Coleman diets did not extend farther than the elimination of the obligate putrefactive organisms and a moderate development of the aciduric types. With a more favorable initial flora, the change was of so radical a nature that the stools finally resembled those of normal infancy in the dominance of the *Bacillus acidophilus* and even the presence of the *Bacillus bifidus* found in children.

In view of the not uncommon use of milk as the chief dietary component in febrile disease, it is inter-

1. Herter, C. A., and Kendall, A. I.: The Influence of Dietary Alternations on the Types of Intestinal Flora, Jour. Biol. Chem., 1910, vii, 203.

2. Rettger, L. F., and Horton, G.: Centralbl. f. Bakteriol., Orig., 1914, lxxiii, 362.

3. Torrey, J. C.: The Fecal Flora of Typhoid Fever and Its Relation to Various Diets, Jour. Infect. Dis., 1915, xvi, 72.

4. The Utilization of the High-Calory Diet in Typhoid Fever, editorial, The Journal A. M. A., Oct. 12, 1912, p. 1378; The High-Calory Diet in Typhoid, Jan. 16, 1915, p. 251.

esting to learn that this food alone did not bring about the transformation of the intestinal flora to such a degree as that which may follow a more liberal carbohydrate feeding. From the clinical standpoint, patients exhibiting a flora of the acidophilic or fermentative type adapted themselves more readily to the high-calory diet. They enjoyed comparative freedom from the distention attending the putrefactive type of flora, and in them the disease showed a tendency to run a mild course. Incidentally it has been noted that the typhoid bacillus was isolated from the stools of the patients on a high-calory diet less frequently than has been reported for other series of cases in which the feeding was less liberal.

Investigations like these of Torrey on the physiologic alternations in the intestinal flora of man are certain to be of great assistance in giving a clue to the most favorable dietaries for various infections, particularly those involving the digestive tract. Even where the invading micro-organism does not primarily direct its harmfulness toward the alimentary canal, the bacterial conditions of this region, which may add to the burden of an already intoxicated individual, are surely not without moment. The bacteria found in the intestine deserve renewed consideration not alone as causative agents of specific disease, such as typhoid, cholera or dysentery, but also as the factors which determine the production of chemical products affecting in no small measure the sense of bodily and psychic well-being.

EXERCISE AND THE BLOOD

Despite the fact that muscular activity and exercise in the form of various athletic sports are widely lauded both as promoters of health and as remedial agencies in certain conditions, there are few systematic treatises on the subject considered from these aspects. Playgrounds and physical education are being provided to overcome the admittedly pernicious influence of indoor life on the young and the adult. Athletic training is sometimes ordered to counteract certain pathologic manifestations. It can scarcely be said, however, that the domain of the physiology of exercise, considered as an independent discipline, has yet been adequately explored in a thoroughly scientific manner. If exercise is to gain a permanent place in a complete scheme of education and in the treatment of abnormal or diseased conditions, this "Cinderella of the therapeutic family," as Dr. R. Tait McKenzie has termed it, should be placed before the profession in its true character.

Isolated observations regarding the influence of muscular exertion and even of prolonged training on individual functions of the body are recorded in considerable number. For the most part they have remained, up to the present, as detached facts. Our knowledge regarding some of them has at length reached a point at which a survey of the situation presented and its physiologic significance may be essayed. This statement applies to the effect of muscular activity on the blood.

It has become evident that the muscular exertion incident to such performances as running, walking, bicycle riding, swimming and other sports almost invariably causes an immediate increase in the number of red corpuscles in a unit volume of the blood, together with a leukocytosis.[1] Detailed data are of little direct significance when the conditions under which they are obtained vary as widely as they do in activities of different individuals at different times. Some representative indications of the range of the effects is afforded by the recent determinations of Schneider and Havens[1] at Colorado College in Colorado Springs. They found that the immediate influence of physical exertion on the blood of the peripheral capillaries was one of concentration in which the percentage of increase varied as follows: hemoglobin from 3.5 to 10.9, erythrocytes from 3.2 to 22.8, and leukocytes from 13.8 to 130.2. The specific gravity increased proportionately with the red corpuscles. Within a few minutes after the close of the exertion, the blood began to be diluted, and this usually resulted in a subnormal specific gravity and content of hemoglobin and red corpuscles. At the end of the exertion, the differential counts of the leukocytes showed no change; but very soon the polymorphonuclears increased from 9 to 45 per cent., and the total number of mononuclear elements decreased from 14 to 55 per cent.

As Hawk has already pointed out, several explanations for the increase of erythrocytes in exercise readily suggest themselves. Thus, there may be a production of new corpuscles, concentration of the blood through increased urine formation and copious sweating, concentration of the blood through increased evaporation in the lungs, passage of fluid from the blood to the active muscles, concentration of the blood through vasomotor contraction and rise in blood pressure, and sudden passage into the blood of a large number of cells lying dormant in various parts of the body. Some of these factors, notably those involving removal of water by sweating and respiration, doubtless help to induce some concentration of the blood. The increment in the number of corpuscles is so prompt as to make it probable, when taken into consideration with other factors, that the primary agency in this phenomenon is not the loss of water from the body, but the discharge of a large mass of sidetracked corpuscles into the general circulation.

The splanchnic area appears to be the chief reservoir for the reserve red corpuscles. According to Schneider and Havens, the picture of the blood

1. Hawk, P. B.: On the Morphological Changes in the Blood after Muscular Exercise, Am. Jour. Physiol., 1904, x, 384. Schneider, E. C., and Havens, L. C.: Changes in the Blood after Muscular Activity and During Training; Ibid., 1915, xxxvi, 239. The older literature is referred to in these papers.

changes in exercise may be briefly summarized as follows: During muscular inaction, a large mass of the blood is diverted to the splanchnic area, where it probably stagnates and gives up plasma as lymph. There is also throughout the remainder of the body, especially in the limbs, an accumulation of lymph. With the onset of muscular activity, the carbon dioxid content of the blood rises, this carbon dioxid stimulates the central nervous centers which regulate the secretion of the suprarenal glands, and hence the output of epinephrin is increased. The epinephrin causes a constriction of the blood vessels of the splanchnic area, and this forces the stagnant red corpuscles into the general circulation, thus occasioning the rise in specific gravity, hemoglobin, erythrocyte and leukocyte content of the peripheral blood. Further, the contraction of the voluntary muscles accelerates the flow of lymph, throwing lymph rich in leukocytes into the blood. The increase in red corpuscles and hemoglobin makes it possible to supply more readily the greater demand for oxygen made by the active muscles. Shortly after the close of the exercise, the carbon dioxid content of the blood falls below normal; as a result, the discharge of epinephrin becomes subnormal and the blood once more accumulates in the splanchnic area, so that there is a gradual return to the normal composition and even a temporary subnormal content in red corpuscles.

Observations corroboratory of this view deserve mention here. Abdominal massage and pressure raise the content of hemoglobin and red corpuscles in the blood of the peripheral capillaries. A tightly drawn belt or pressure on the abdomen following exertion prevents in large measure the customary subsequent dilution of the blood, presumably by delaying the side-tracking of the formed elements back into their splanchnic reservoir.

It has been maintained by some that there is a rapid destruction of red corpuscles in violent exercise, especially because the very considerable early increase becomes gradually less pronounced. The newest evidence[1] does not support this view. It suggests that the ultimate decrease in hemoglobin and red cells is not due to an actual disintegration of the corpuscles, but rather to their stagnation in some of the capillaries.

Schneider and Havens appear to have furnished the first carefully obtained data respecting the deportment of the little understood platelets in exercise. There is a marked fall in the number per cubic millimeter of blood, shortly after cessation of muscular action, of from 17 to 30 per cent. Later there occurs a sort of overproduction leading to a rapid increase. It would be premature to theorize in this field.

The increased count of blood corpuscles noted after massage[2] probably has much in common with the phenomena just described. It is important from every standpoint to learn conclusively whether some of the procedures of so-called physiologic therapeutics bring about their blood changes by promoting new hemopoietic activities or merely by inducing a redistribution of the circulating fluids. To this end further investigation is warranted.

2. Mitchell, J. K.: Am. Jour. Med. Sc., 1894, cvii.

DEATHS FROM THE SEQUELAE OF TYPHOID FEVER

We have statistics on the approximate number of deaths from typhoid fever, so far as concerns those who die during the acute stage of the disease; estimates of the number of persons incapacitated for varying periods as a result of illness with typhoid, and estimates of the financial loss to the community. But the results of the sequelae or after-effects of the disease, on those who have survived the acute effects of the infection, have not been considered. Such a study is difficult, for it is necessary that reliable record must be had of the illness, and the patient must be kept under observation for several years. Moreover, the number of persons observed must be sufficiently large to eliminate the undue prominence of uncontrollable factors.

Recently Dublin[1] has reported the results of a study of 1,936 cases of typhoid fever recorded in 1911 among the reports of the visiting nurse service of the Metropolitan Life Insurance Company. Of these, 362 were eliminated from consideration, as the diagnosis was not considered to have been accurately established. The record of the remaining 1,574 cases seems to have given new information of much value in regard to the effect of typhoid fever on vitality during the first three years following recovery. One hundred and forty-six of the patients died while under treatment, a lethal rate of 9.28 per hundred treated. The principal complications in the fatal cases were intestinal perforation and hemorrhage, meningitis, pneumonia and heart involvement, which accords with previous observations.

To determine the effect of the disease on vitality for the three years following the attack, it was necessary to compare the actual mortality of the 1,428 survivors with the expected mortality among the same class of persons. This was done by distributing the 1,428 cases by sex, color and 10-year age period, and by comparing them with similar groups taken from the mortality tables of the company for the same years. In other words, the mortality was not an arbitrary measure, but gave the death rates which persons of the same age, sex and color among the policy holders had experienced for the same years. From such comparisons, it was found that in the series of 1,428 persons the expected number of deaths was 26.45, whereas the actual number that occurred was 54, the conclusion being that during the first three years after recovery

1. Dublin, Louis I.: Typhoid Fever and Its Sequelae, Am. Jour. Pub Health, January, 1915.

from typhoid fever, the mortality is twice the normal. This increased rate, however, was not uniform for all three years, being greatest during the first year following recovery, less during the second year, and still less the third.

As a cause of death among the fifty-four patients who died within the three years following recovery, tuberculosis heads the list (39 per cent.), with diseases of the heart following (14.8 per cent.). Dublin believes that, in the United States each year, 8,000 deaths occur among persons who have recovered from an attack of typhoid fever but who, as a result of impaired vitality from the disease, succumb during the first or second year after recovery.

Similar studies should be made of the after-effects of other diseases. We know, for example, in a somewhat general way that measles and whooping cough, as well as other diseases, are not infrequently followed by tuberculosis; but we have not had an accurate comparison of the actual to the expected mortality, and it is of importance that we should have such comparisons.

DISEASES OF THE SOIL

For the better part of a generation, we have been hearing of the exhaustion of the soil in this country. Abandoned farms in New England had to be given up because they returned such poor crops that their further cultivation was not worth while. Important elements for plant life and growth were said to have been ruthlessly taken from them by wasteful farming and never restored, and it was prophesied that the same thing would happen to our great farming lands in the Middle and Far West. The popular impression existed that the earth beneath our feet was "an inanimate mixing bowl out of which plants ate as cattle feed from the trough. What was not put in could obviously not be taken out; and since chemical analysis proved that plants do absorb mineral plant food elements, the bowl must quite as obviously run empty unless we poured back as much as the crops took out." This seemed an eminently satisfactory theory. When the United States Bureau of Soils undertook an investigation, however, it found no basis for the general deterioration of the soil thus suggested. It did find that properly cultivated soil increased in fertility in the course of time, but that certain changes in the soil, which might well be called "diseases," were responsible for the lessening of the crops; further, these diseases could be treated rather readily, once they were recognized.

The whole story has many analogies with certain theories of human diseases and with many of our medical problems. Quite apart from the interest which physicians have in the food supply of the country, a description of the investigation by Bruère[1] is interesting. In recent years, the United States Bureau of Soils has been investigating cases of "sick soil," finding the true diagnosis, and then suggesting the remedy. The experiments and observations have been conducted with wheat plants which, it is suggested, correspond closely to the guinea-pig of the physiologic and pathologic laboratory. The whole mode of investigation is eminently suggestive of an application to another department of human interest of the methods which have proved successful in the investigation of human disease. The agricultural chemists, however, have found more grounds for the idea of chemical change as a reason for disease than have been found in our investigations of human beings. It is possible that they may thus give back to us by suggestion at least even more than they have borrowed from us.

Certain substances develop in soils which make it difficult to obtain good crops, in spite of the fact that there may be an abundance of fertilizer and apparently plenty of plant food in the soil. They act as inhibitors of plant nutrition and growth. Soil taken from Takoma Park, Maryland, was found to contain an abundance of the mineral plant food elements, and yet it was exceedingly infertile and did not respond to treatment either with manure or with commercial fertilizers. After careful investigation, it was found that certain substances like picolin, carboxylic acid, uvitonic acid and dihydroxystearic acid occurred in this and other soils of marked infertility. The last substance, particularly, reduced the power of plants to transpire moisture to less than one fourth of the normal, and this so disturbed their metabolism as to cut their green weight in two. In the course of a short time it actually killed the plants exposed to its action.

The question arose as to the origin of this undesirable substance. It was found to be due probably to the occurrence of fungi and molds on the soil. Wherever there was improper drainage and careless ploughing, so that soil became water-logged or failed to be properly treated, these inhibiting chemical substances occurred. They are much the same as tuberculosis in human beings, which flourishes best in dark, damp, ill-ventilated rooms. When the soil samples containing such substances were kept in greenhouses under conditions of good aeration, the deterioration chemicals disappeared after a few weeks and left the soil greatly improved for plant growth.

Out of this investigation has come the interesting conclusion that the soil is not a dead set of minerals in a mixing bowl, but an organism having hitherto unperceived likenesses to the body of man. Cultivation seems to be to the crop-bearing earth what exercise and air are to human beings, and there are probably laws of hygiene and sanitation quite as applicable to the control of the soil's health as to that of mankind. As the report of the United States Bureau of Soils says, "The soil has vital functions. It cannot be con-

1. Bruère, R. W.: The Control of Soil Fertility, Harper's Month. Mag., April, 1915.

sidered as the dead, inert remains of rocks and previous vegetation. It is not dead, but is endowed with functions analogous to those of life itself. In it go on the same processes of solution and deposition that have taken place in past ages in connection with the geologic action upon the rocks and minerals in the earth's crust; the same chemical and physical interactions as those through which the movement of subsurface waters generally have formed ore deposits; the same processes of fermentation, digestion and decay of organic materials as those that take place in animals and plants through the agency of enzymes, bacteria, fungi, and molds."

A generation ago, chemistry and physics were everywhere invading the biologic domain and apparently ousting biology from her place as mistress of the household and making it clear that living processes were due only to physical causes and effects. Now biology is vindicating her claims not only in her own proper field, but also in borderlands where physics and chemistry were thought to hold absolutely indisputable sway. The vital forces, in addition to reclaiming their own, are extending their realm. This latest recognition of the soil itself as strikingly like a living organism is not only scientifically valuable, but also eminently suggestive of the trend of modern science.

THE PREVENTION OF TYPHUS FEVER

Among the brightest pages of the history of American medicine are those recording the work of American scientists on the part played by insects in the transmission of disease. The foundation of the later work on the transmission of disease was laid by Theobald Smith in his work on the transmission of Texas fever of cattle by the tick. That pioneer work opened up and laid the foundation for practically all the subsequent work by others, both in the United States and abroad, in this important branch of medical science.

Since then other insect-borne diseases have been added to the list by American scientists—yellow fever through the work of Reid, Carroll, Lazear and Agramonte; Rocky Mountain spotted fever by Ricketts, King and McClintic; typhus by Anderson and Goldberger, Ricketts and Wilder; plague by McCoy, and anthrax by Mitzmain.

By applying the principles determined from a consideration of the work of these investigators to the control of different diseases, many of them have been brought under control or have been practically eradicated from this country. By the application of measures based on the part played by the tick in the transmission of Texas fever of cattle, the area of infection has been greatly reduced, and each year sees it still further limited.

Since the brilliant campaign of the Public Health Service, under the leadership of White, in New Orleans in 1905, the South has lost its terror of a yellow fever epidemic. Outbreaks of bubonic plague are quickly brought under control by giving attention to the part of the rodent and the flea.

The most recent work of American investigators on insect transmission of disease, that of the conveyance of typhus fever by the louse, promises to have a vital part in the control of typhus in Serbia and eastern Europe, if reports of conditions in the European war zone are not exaggerated.

Recently Anderson[1] has discussed the etiology of typhus and the methods for its control based on the part played by the louse as an intermediary. In this connection it is of interest to note that, according to Nicolle, antilouse measures have had a remarkable effect on the prevalence of typhus fever in Tunis. This disease is very prevalent among the native population. In 1909 there occurred in Tunis 836 cases of typhus. In 1912 attempts were made to control the disease, based on antilouse measures, and as a result there occurred during that year but 22 cases. The only prophylactic measure enforced was the systematic destruction of lice and their eggs found on the clothing and persons of those in the vicinity of patients suffering from typhus.

Anderson, in his discussion of the subject, states that there is no experimental evidence to support the view that typhus is acquired in any manner other than by the bite of lice which have previously fed on a person sick with the disease. Such being the case, the fundamental procedures on which prevention may be based may readily be deduced. According to Anderson, these measures may be broadly proposed under the following headings:

1. Measures for the reduction of lice infestation among the population in general.

2. The destruction of all lice and their eggs found on the bodies, clothing, bedding and surroundings of all cases of typhus, typhus suspects, and contacts.

3. The adoption of measures, by persons in the vicinity of cases of typhus, to reduce or prevent the possibility of their being bitten by lice.

4. Inoculation with the mild type of the disease (Brill's disease) by persons contemplating entering localities where typhus is prevalent. Should Plotz'[2] work be confirmed, this may be replaced by the use of a vaccine prepared from the typhus fever germ.

The measures to be adopted under the first heading are, to a considerable extent, educational, except in institutions and places over which the sanitary authorities have supervision, such as bath houses, lodging houses, and other places where numbers of persons may congregate.

1. Anderson, John F.: The Etiology of Typhus Fever and the Methods of Its Prevention, Pub. Health Rep., April 30, 1915.
2. See editorials: Typhus in Serbia, THE JOURNAL, April 17, 1915, p. 1329; The Cause of Typhus Fever, THE JOURNAL, April 24, 1915, p. 1429.

In surroundings where lice may be found, systematic efforts should be made for the destruction of lice and their eggs. These efforts consist in the use of insecticides, both chemical and physical, bearing in mind the important point that the louse requires frequent feedings of blood and therefore is most likely to be found on recently used clothing or bedding. It is not difficult to kill when exposed to insecticides, but its eggs are much more resistant to chemical agents, though readily destroyed by heat or steam.

Under the second heading comes, first of all, the institution of measures requiring the prompt report to the sanitary authorities of all cases or suspected cases of typhus fever. Such cases should be promptly seen and the inspector should be satisfied that the patient's surroundings are free from lice, in which case the patient may, without danger to the community, be treated at home. If, however, such is not the case or there is doubt, the patient should at once be removed to a hospital, and the place from which he is removed should be treated to destroy all lice and even their eggs.

For the treatment of material, such as clothing and bedding, the use of steam is the method of choice. All suspects and contacts should be bathed, the lice and their eggs in the hair being destroyed, and a change of clothing should be given and the old clothes disinfected. They should be kept under observation for at least twelve days.

The measures to be adopted under the third heading are such as should prevent or minimize the possibility of persons near cases of typhus being bitten by lice. It should be borne in mind that the louse has not the radius of action of the mosquito or even of the flea; therefore, the striking distance of typhus is shorter than that of yellow fever, malaria or plague. For the transference of lice from one individual to another, rather intimate association with the lice-infested person or his surroundings is necessary; and because the louse requires frequent feedings to maintain life, this means, for practical purposes, surroundings recently occupied by persons and possibly by animals.

There is but little to say in regard to the procedures suggested under the fourth heading. The case mortality of the mild form of typhus (Brill's disease), so widespread in the United States, is very low, probably not over one per hundred attacked, while the case mortality in Serbia, for example, is possibly twenty or perhaps more per hundred attacked. For this reason alone (and there are other reasons) the advisability of inoculation with the mild form of typhus would certainly seem worthy of serious consideration for those going to places where typhus is prevalent in a virulent form. Some may question the advisability of inoculating with the mild form of the disease in order to protect against the virulent type; but, as Anderson says, it is certainly worthy of consideration.

The inability of the louse to transport itself, except for very short distances, explains the many times observed fact of the short striking distance of typhus and that it is those who come into most intimate contact with the sick who are most apt to be attacked. This fact, together with the necessity for frequent feedings of blood by the louse, have important practical relations in the prevention and control of the disease.

Current Comment

AN ANTIVIVISECTION INQUIRY

A circular letter is being sent to laboratories throughout the country asking for a report on the number of mammalian animals used for scientific research or physiologic demonstration during the year ending Dec. 31, 1914. The report is to include statements regarding the number (1) used for demonstrations, (2) experimented on by students, and (3) employed for research. The letter is sent out by the Society for the Prevention of Abuse in Animal Experimentation, and is signed by their treasurer and counsel, Mr. Frederick P. Bellamy. Mr. Bellamy declares that one of the objections to animal experimentation is that no one can tell its extent. The "extent," however, has not been in question. The feature that the antivivisectionists have objected to and have made much of is the "extreme pain" and "appalling suffering" which they have *assumed* that animals experience in the laboratories. Against painless experimentation most of them would have no objection. It is to be noted that in the inquiry now being made, there is no mention of anesthesia. The figures as to the *number* of animals used would be of not the slightest significance, therefore, unless it is assumed that the animals are cruelly treated. From the publications of the Society for the Prevention of Abuse in Animal Experimentation, it is fair to suppose that there would be no hesitancy in their assuming frequent abuse of animals. For example, they quote with approval Spencer's saying: "We consider as wholly unjustifiable the common practice of subjecting animals to torture in the laboratory or classroom merely for the purpose of demonstrating well-known and accepted facts. We hold that the infliction of torment upon a living animal under such circumstances is not justified by necessity, nor is it a fitting exhibition for the contemplation of youth." To this we say, amen. But we also say that there is no evidence to justify the assumption that the teachers of medicine in this country, while making demonstrations to their students do inflict "torture" and "torment." In the circular letter the statement is made that the Society for the Prevention of Abuse in Animal Experimentation is not opposed to vivisection. It happens, however, that the treasurer and counsel of that society has on two occasions been prominent at legislative hearings in New Jersey, in his vigorous opposition to the establishment, in that state, of the Rockefeller Institute's Laboratory for the Study of Animal Dis-

eases. Action speaks louder, etc. In consideration of the facts given above, it is clear that any information secured by the society which Mr. Bellamy represents is likely to be twisted to its purposes and in opposition to the methods of medical research.

THE NONEXISTENCE OF UROLEUCIC ACID

The chemical anomalies are quite as interesting as the structural peculiarities which are so frequently encountered in medicine, although, as a rule, they are less readily observed, because of the great difficulty of detecting metabolic perversions. They do not reveal themselves in the conspicuous way that discloses morphologic defects. Alkaptonuria and cystinuria are sufficiently rare to excite interest whenever they are discovered. The cause of the immediate urinary conditions which determine these designations is now well known. The abnormal metabolism of the amino-acids tyrosin and phenylalanin in alkaptonuria result in the excretion of homogentisic acid, an aromatic derivative of known constitution. Years ago Kirk[1] described what he believed to be an analogous compound in so-called "alkapton" urine, and named it uroleucic acid. This alleged finding received the support of the late Professor Huppert of Prague, a chemical investigator of the urine. Although homogentisic acid has been described in at least seventy-five cases of alkaptonuria in the intervening years, there have been only two or three isolated mentions of the occurrence of uroleucic acid in pathologic urine. The name and its assumed significance has, however, become one of the inherited features which go to swell the anomaly lists of textbooks and have been copied from decade to decade. Dr. Adolf Oswald[2] of Zurich has had an opportunity to examine urine specimens from both of the historic patients who were the occasion for the anomalous findings hitherto reported. A careful chemical investigation has convinced him that the alleged uroleucic acid was nothing other than homogentisic acid. In accord with this conclusion the current statements may now be revised.

FETAL ERYTHROBLASTOSIS, A FORM OF CONGENITAL DROPSY

Congenital dropsy may be caused in various ways: It may depend on cardiac anomalies and diseases, on obstructions to the portal circulation, on syphilitic infection, or on other less common causes. Recently it has been established that general congenital dropsy with hydramnios may be associated with a pathologic state of the blood, and of blood formation, and there is good ground to believe that this is a distinct form of congenital dropsy and hence a hitherto unrecognized disease. To Schridde belongs the credit of having made this discovery (1910), which has been substantiated by several other observers.[3] The disease is characterized by general dropsy — anasarca and fluid in the cavities — hydramnios and enlargement of the spleen and liver. In these organs, especially, there is found microscopically a great accumulation, both inside and outside of the blood vessels, of erythroblasts and in less degree of other marrow cells. The liver cells proper are crowded out, and there are no follicles in the spleen. Even the kidneys, the adrenals and lymph glands may contain erythroblastic centers. In the blood the number of erythroblasts is far in excess of the normal. There being hemosiderin — iron containing pigment from red corpuscles — in the liver and spleen, Schridde set up the idea that the condition is due to a severe anemia with compensatory hematopoiesis not caused by syphilis. Others assume that the extramedullary formation of blood corpuscles is the result of some form of toxic action. In the case described by Chiari there was no blood pigment in the liver and spleen, and consequently nb indications of any antecedent destruction of blood corpuscles. The heart is often hypertrophied, but as yet we have no satisfactory explanation of the dropsy. It undoubtedly indicates some profound metabolic disturbance. The name "erythroblastosis" was suggested by Raubmann, and as this name signalizes one of the most distinctive features of the condition, it probably will be used, at least until some still more appropriate name based on a better understanding of the nature and cause of the disease is suggested. Since Schridde described this form of congenital dropsy, Fischer, from search of the older literature, found about twenty cases described as congenital leukemia and otherwise, which in all probability were instances of erythroblastosis, and several new cases have been observed. That the disease has been overlooked so long is due to careless and superficial examination of the bodies of infants congenitally dropsical. Now that such an interesting and remarkable condition has been uncovered among cases of congenital dropsy, they are certain to receive more careful scrutiny, and no doubt soon we shall learn more about this new form of blood disease.

1. Kirk, R.: On a New Acid Found in Urine which Darkens with Alkalies (Alcaptonuria), Jour. Anat. and Physiol., 1889, xxiii, 69.
2. Oswald, Adolf: Ueber die Nicht-Existenz der "Uroleucinsäure," Ztschr. f. physiol. Chem., 1914, xciii, 307.
3. For review of the literature see Chiari: Jahrb. f. Kinderh., 1914, lxxx, 561.

Vagaries of Rifle Bullets.—Two instances of the action of rifle bullets in the war, as related in the *Lancet* by a correspondent in northern France, are of more than ordinary interest. One bullet which had traveled probably 200 or 300 yards and was therefore almost at its maximum velocity, entered the head just in front of the ear, passing through the sphenoid and having its exit at a point almost exactly opposite the point of entrance. Its track was perfectly straight. Though this wound was one really of the face only, it proved instantly fatal. On opening the skull the reason was apparent. It had reduced the under surfaces of the frontal lobes to a structureless jelly. The rapid movement of the bullet had given rise to lines of force emanating in all directions and had pulpified the brain. This is somewhat contrary to the belief that a rapidly moving missile exerts a more knife-like action than a slow one, with less collateral injury. In the other case the bullet had traveled probably 1,500 to 2,000 yards before reaching its mark and the residual momentum was comparatively small. This bullet entered the forehead and was found just inside the skull. It had traversed the head, impinged on the inside of the occipital bone and rebounded along the original track and was only a short distance from the point of entrance. There was no general bruising of the tissues surrounding the track of the bullet.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST; SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

IOWA

Personal.—Dr. Henry Matthey, Davenport, is on duty with the German Red Cross at Lazarett, Holzen, Germany. ——Dr. Joseph A. Juen, Ossian, is reported to be seriously ill in Cresco Hospital.

District Society Organized.—Physicians from Lyon, Osceola, Sioux and O'Brien counties met in Sheldon, April 16, and organized a district medical society to be known as the Big Four Medical Society, with an initial membership of thirty-five.

Reorganization Bill Killed.—In the state senate, April 16, the bill for the reorganization of the State Board of Health providing seven members for the new board, five of whom should be instructors in the state university, one a member of the faculty of the state college and the seventh the state labor commissioner, was defeated by a vote of 21 to 23.

ILLINOIS

Health Sunday in Springfield.—May 16 has been designated as Health Sunday and on that day physicians from the state who have come to attend the meeting of the Illinois State Medical Society will fill the pulpits of the various churches in the city.

Smallpox at Joliet.—The discovery of cases of smallpox in the penitentiary at Joliet has caused the institution to be placed in quarantine and neither prisoners nor the public will be permitted to go in or out until the quarantine is raised. It has compelled the postponement of work on country roads by the squads of honor men from the prison.

Bids for Sanatorium.—Rockford has decided on the establishment of a municipal tuberculosis sanatorium to cost about $17,000 and to be ready for occupancy in September. The building will be two stories and basement in height and will be constructed of reenforced concrete tile and brick. The institution is to be known as the Oak Park Sanatorium.

Chicago

Measles at the County Hospital.—A threatened epidemic of measles in the children's department at the County Hospital has compelled the use of a ward in the psychopathic hospital to quarantine the patients. The total cases to April 26 was nine, and the children's ward was closed to further admissions.

New City Officials.—Mayor Thompson has announced the appointment of Dr. John Dill Robertson, a graduate of Bennett Medical College in 1896, and dean of that institution, as commissioner of health, succeeding Surgeon George B. Young, U. S. P. H. S., and of Dr. Michael Joseph Purcell, a graduate of the Chicago College of Medicine and Surgery in 1912, as city physician.

Personal.—Dr. Haim I. Davis has resigned as superintendent of the Cook County Psychopathic Hospital, the resignation becoming effective April 19.——Dr. Davis has been appointed consulting physician to the Psychopathic Hospital.——Dr. Adam Szwajkart, a member of the State Board of Health, has assumed his new duties as head of the County Psychopathic Hospital.——Dr. Gottlieb A. Lurie left Chicago, April 25, to join the Serbian Red Cross service.

Society of Medical History Meets.—The Society of Medical History held its fifth annual meeting on April 27. Dr. Edward Clark Streeter of Boston spoke on "Leoniceno and the School of Ferrara" and exhibited original editions of some of his more noted works. Dr. Charles B. Reed read a paper on "A Physician Not Without Honor," which concerned the life of Haller of Berne and Göttingen and the contemporaneous period. At the annual election the following officers were elected: Dr. Arthur C. Reynolds, president; Dr. Mortimer Frank, secretary, and Dr. Charles B. Reed, councillor.

New Safety Bulletin.—Number eight of the first volume of the Public Safety Bulletin, has just been issued. The Bulletin is issued jointly by the Public Safety Commission of Chicago and Cook County, and the coroner, Peter M. Hoffman. Among the subjects chiefly touched on in the first issue are the burning and scalding of children; a law to decrease railroad fatalities; a law for the detention of mental defects, and a series of recommendations by the coroner and coroner's juries, covering the cases examined during the past few months.

INDIANA

Free Dental Treatment.—In accordance with a contract of the City Board of Health with the Indiana Dental College, all indigent schoolchildren of Indianapolis will be given free treatment and school nurses will take the children to the clinics.

Insanity Statute Held Unconstitutional.—Judge Mull of the superior court, Indianapolis, has given his opinion that the statute under which insanity proceedings are held by justices of the peace is unconstitutional. This rule is based on the fact that the statute does not require notice to the person said to be insane before final judgment and does not guarantee to such person an appearance in court.

State Board News.—Dr. T. Henry Davis, Richmond, who has been a member of the state board of health for twenty-two years, announces that he will not seek reappointment. ——A committee of the state board was appointed to prepare a testimonial for Dr. Davis.——Dr. Charles B. Kern, Lafayette, has been appointed a member of the state board to succeed Dr. T. Henry Davis, the appointment to become effective May 6.

Personal.—Dr. James E. Weller, Richmond, who bruised his knee while working on his farm in Orlando, Fla., recently, developed septicemia and on April 12 it became necessary to amputate his right leg.——Dr. Paul E. Bowers, Michigan City, physician in charge of the Indiana State Prison for the last four years, has been reappointed medical superintendent of the Indiana Hospital for Insane Criminals, the medical and psychiatric work of which was organized by him in 1911-12.——Dr. Arthur R. Simon, La Porte, fractured both bones of his right arm while cranking his automobile, April 16.——Dr. William Palm, Harmony, health commissioner of Clay County, fractured his clavicle and sustained other injuries in a collision between automobiles at Brazil, April 7.

MARYLAND

New Building for Hebrew Hospital.—The Hebrew Hospital will have another handsome and substantial new building added to its group through the beneficence of Mr. and Mrs. Morton Samuels, as a memorial to Mrs. Samuel's parents. The building will be for a general dispensary.

Hospital Building Opened.—A public inspection of the maternity building of the Hebrew Hospital group took place on April 18. The equipped building is the gift of Abraham Mendels as a memorial to his brothers. It is three stories high and measures 44 by 100 feet. A Roentgen-ray room is one of the main features. A new isolation ward at the hospital has been completed and was also opened for inspection on the same date.

Personal.—Dr. Archibald C. Harrison was successful in the suit recently brought by Thomas J. Copeland for neglect in the treatment of an injured ankle.——Dr. George H. Hocking, Govans, has been appointed a member of the Maryland State Lunacy Commission, to succeed Dr. Thomas H. Brayshaw, Glenburnie, whose term of office has expired.——Dr. John Howland, Baltimore, with his brother and sister has given $15,000 to Yale University as a memorial to their father who was a member of the corporation of Yale. The gift is to be awarded as a prize to some citizen of this country in recognition of sole achievement of marked distinction in literature or fine arts or the science of government.

MASSACHUSETTS

State Medical Inspection Urged.—In a special message sent to the legislature April 16, Governor Walsh recommended to the legislature authorities, the appointment of a state medical inspector to supervise the work of the medical inspectors in public schools of the state.

Creel to be Health Officer.—The mayor of Boston announces that he has received information which leads him to believe that he will secure the services of P. A. Surg. Richard H. Creel, U. S. P. H. S., as health officer of Boston. It is now believed that Dr. Creel will be given a leave of absence, May 15, that he may accept this position.

Personal.—Dr. Edmund W. Wilson has been appointed assistant superintendent of the Boston City Hospital, succeeding Dr. Frank H. Holt, resigned.——Dr. Lewis Fish, Fitchburg, has been appointed assistant district health officer, vice Dr. Frank L. Morse, Somerville, resigned.——Dr. Edmund R. P. Fourtin, Waltham, was painfully injured in an automobile accident, April 7.

Septic Sore Throat.—It is reported that more than 100 cases of septic sore throat occurred in the Upham's Corner and Centre Street stations of Dorchester and have been reported to the Boston Department of Health. A prompt investigation was instituted and the source traced to a man employed by a dairy in Milton from whom a milk distributor in Dorchester bought a part of his supply. Prompt and vigorous measures were adopted and carried out, and it is believed the further spread of the disease will be prevented.

Health Conference.—A convention of health officials and others interested in public health was held in Boston, April 29, under the auspices of the commissioner and council of the State Department of Health and the Massachusetts Association of Boards of Health. The convention was presided over by Dr. Allen J. McLaughlin, Boston, state commissioner of health, and addresses were made by the governor, President Eliot of Harvard University, Dr. William T. Sedgwick, president of the American Public Health Association and Prof. Irving W. Fisher of Yale University. At the luncheon of the Massachusetts Association of Boards of Health, the addresses were made by Dr. Eugene R. Kelley, director of the division of communicable diseases and several of the recently appointed district health officers and by representatives of local boards of health.

NEW YORK

Single Head for Hospitals.—The Sage bill, which substitutes for the present state hospital commission the appointment of a single state hospital commissioner with a salary of $10,000 a year, passed the senate, April 13.

Doctor Biggs Will Continue in Office.—Governor Whitman has set at rest the repeated reports that the republican organization would cause the resignation of Health Commissioner Hermann M. Biggs by making the statement that as long as he was governor Dr. Biggs would be retained.

Personal.—Dr. Albert L. Beahan, Canandaigua, was the guest of honor at a reception given by the physicians of Cortland and Homer, April 12. The reception followed an address delivered by Dr. Beahan on "The Advantages to Communities of Moderate Priced Hospitals," before the Homer Hospital Society.

Medical Assistant for District Attorney.—Governor Whitman has signed the Mills bill, authorizing the district attorney of New York to appoint a medical assistant whose duty it shall be to report on all cases of suspicious death or injury coming under the jurisdiction of the district attorney. The salary is to be fixed by the district attorney.

Dispensary Opened.—An obstetrical dispensary was opened in Buffalo, April 13, under the management of the Bureau of Hygiene of the Department of Health. In addition to the dispensary, a bureau is to be conducted in connection with child hygiene work at the health center, where mothers will be taught by competent instructors, how to care for their babies.

Spring House Cleaning in State.—Dr. Hermann M. Biggs, commissioner of the State Department of Health, has asked the presidents of local health boards throughout the state to organize a state-wide "clean-up week." Instructions are given for the cleaning of houses, especially cellars, and for cleaning up the premises in general. Special emphasis is laid on the fact that this is the breeding season of the house fly and that every fly killed now means many thousands of flies less next August.

Vigorous Protest Against Antivaccination Bill.—The Kings County Medical Society, through the chairman of its legislative committee, is using every effort to have the governor veto the Tallet-Jones antivaccination bill, which was recently passed by the senate. He points out that if this bill becomes law it will mean that 50,000 schoolchildren will not be vaccinated next year and that that will mean that in a few years the majority of the people in this state will be unvaccinated. The State Medical Society and other medical organizations are unqualifiedly against the bill.

New York City

Personal.—Dr. Andrew Hunter has accepted the professorship of pathologic chemistry in the University of Toronto. ——Dr. Herman T. Radin has been appointed physician to Bronx County Jail.

Fever Suspects Detained.—The quarantine officials of New York City removed eighty-six passengers from the steamer *Themistocles* from Piraeus, Greece, and transferred them to Hoffman Island for observation and treatment.

Teacher Mothers Get Leave of Absence.—In accordance with the resolutions recently adopted by the board of education, providing that married teachers expecting to become mothers must ask for a leave of absence of two years, eighteen teachers have asked for this leave of absence and the board of education has granted it.

Guarding Against Typhus.—Dr. Joseph H. O'Connell, health officer of the port of New York, has notified the steamship companies that "The epidemic outbreak of typhus fever in countries affected by the present war makes it desirable that steamship companies carrying steerage passengers from infected districts shall take precautions at ports of embarkation to prevent the importation of this disease into the United States."

Dedicate Children's Division of German Hospital.—The Dr. Abraham Jacobi Division for Children of the German Hospital was dedicated a few days ago. This division has been housed in the old private ward building of the hospital which has been thoroughly renovated and remodeled. Accommodations have been made for sixty-five beds, with a roof garden, play room and all the other adjuncts of a children's hospital. The children's division is the gift of Mrs. Anna Woerishoffer who has contributed in all $150,000 for this purpose. Dr Jacobi made the principal address.

Special Children's Classes at the Tuberculosis Clinics.—The department of health announces that special classes for children will be conducted on Saturday mornings at the Lower East, Lower West, Harlem Italian and Southern Italian clinics in Manhattan; at the Northern and Southern clinics in the Bronx, and at the Main, Brownsville, Germantown and Eastern District in Brooklyn. Instruction in these classes is paid for by the Woman's Auxiliary and nourishment in the form of milk or some articles of food is served to the children. Arrangements are being made to open similar clinics in the Corlears and Middle East clinics and to increase the number of night clinics in the Borough of Brooklyn.

Certificates of Contagious Disease.—In view of the theories at present held that the transmission of contagious disease rarely occurs through a third person and that it is unnecessary to exclude from school children in a family in which the patient is properly isolated who have previously gone through an attack of that particular disease, and since the methods of determining such immunity have hitherto been unsatisfactory, the health department now proposes to issue a certificate to each child reported to be suffering from diphtheria, scarlet fever, or measles, on the termination of the case. By this means all immune schoolchildren brought up in this city would be in possession of a health passport. It is believed that in addition to the benefits that such a certificate would confer on the holder, it would bring about a more general and voluntary compliance by both physicians and parents with the requirements of the sanitary code regarding the reporting of cases of infectious diseases.

Health Conditions in Private Schools.—A special committee appointed by the health commissioner to investigate the private Jewish schools conducted in tenement houses has reported recently on nineteen such schools with recommendations for the improvement of sanitary conditions. These schools are located in tenements, loft buildings, over stables and in all sorts of unsuitable places, with wretched ventilation and light conditions, many of them filthy, with defective toilet facilities, and so situated and equipped as to be veritable fire traps. The committee recommends that all such schools register with the department of health at regular intervals, and that they be required to conform to all sanitary and hygienic requirements, with frequent inspections by the health and fire departments and be made to comply with the regulations regarding fire hazards. It is said there are 500 of these schools in New York.

Medical Quacks Raided.—On the afternoon of April 21, fifty policemen, acting simultaneously, raided twenty-four "Medical Museums" in New York City and arrested forty-three alleged medical quacks. The Bureau of Industries

and Immigration of the State Labor Department and the New York County Medical Society had been working for months perfecting a case against each defendant before this action was taken. It is reported that when the evidence is given out it will show a nation-wide system of extorting money through quacks who persuade their victims that they are affected with tuberculosis or cancer and offer to effect cures for sums ranging as high as $500 or $1,000, according to the circumstances of the patient. It is estimated that within eight months since these medical institutes and museums have been under the observation of the police they have taken from victims, mostly foreigners, more than $500,000. The prisoners were held in bail ranging from $500 to $1,000.

NORTH CAROLINA

Society Reorganized.—The Catawba County Medical Society was reorganized at Newton, April 13, with every physician in the county except one on its list of members. Dr. George H. West was elected president and Dr. George W. Shipp, secretary-treasurer, both of Newton.

State Sanatorium to be Enlarged.—Plans are being considered for the enlargement of the State Sanatorium, Montrose, for which about $50,000 is now available. A new receiving department is to be created and a building for those seriously ill and a new power and steam heating plant is also being considered.

Sanitation Campaign for Orange County.—At a conference of officials of the State Board of Health and the United States Public Health Service, Orange County has been selected as the next county in the state in which the federal government will cooperate with the state and local authorities in a campaign for sanitation. The work will extend from May to October.

Personal.—Dr. William P. and Charles R. Reaves, Greensboro, have begun the erection of their new private infirmary building.——Dr. George M. Cooper, Clinton, formerly president of the North Carolina State Health Officers' Association, has been appointed chief of the Bureau of Rural Sanitation of the State Board of Health.——Senior Surgeon James B. Stoner, U. S. P. H. S., recently in charge of the United States Marine Hospital at Pittsburgh, has been placed in command of the service at Wilmington, succeeding Dr. Ernest W. Scott, temporarily in command during the absence of Dr. Charles Wardell Stiles.——Dr. Milton T. Greenville Edgerton, Jr., Freemont, has been elected whole-time health officer of Pitt County.——Dr. John A. Dowd, Biscoe, is reported to be critically ill with pneumonia.

OKLAHOMA

New Hospital.—There has already been subscribed $2,100 toward the $2,500 required for the construction of a building for a hospital at OKeene.

Health Comissioner's Office Transferred.—Dr. John W. Duke, Guthrie, State Commissioner of Health, has transferred his office from Oklahoma City to Guthrie.

Deaths in Asylum Fire.—It is reported that two patients of the State Insane Hospital, Fort Supply, were burned to death in a fire which destroyed a wing of the building, March 30.

State Board Appointments.—Governor Williams on April 17, reappointed the following members of the state board of medical examiners: Drs. LeRoy Long, McAlester; Melvin Gray, Mountain View; and W. LeRoy Bonnell, Chickasha; and appointed Drs. B. L. Denison, Garvin; Ernest B. Dunlap, Lawton; Ralph V. Smith, Tulsa; William T. Ray, Gould; H. C. Montague, Muskogee; and Orion R. Gregg, Alva, members of the board.

Personal.—Dr. William A. Kendall, Crescent, who has been laid up with a bad sprain of the ankle, is convalescent. ——Dr. George R. Norman, Luther, has recovered from an attack of pneumonia.——Dr. William G. Kiebler, Goltry, who fractured his arm recently, is now able to attend to his practice.——Dr. Robert H. Harper, Afton, was recently operated on for gastric ulcer.——Drs. Charles D. F. O'Hern and Walter E. Wright, announce that they have purchased the Physicians and Surgeons Hospital of Tulsa.

PENNSYLVANIA

Antivaccination Bill Defeated.—The antivaccination bill was defeated in the House April 14 by a vote of 106 to 41.

Free Wassermann Test.—The State Department of Health Laboratory announces that it will hereafter make Wassermann tests for physicians of the commonwealth, free of charge.

House Warming.—Medical Hall, 429 Walnut St., Reading, the new home of the Berks County Medical Society was formally opened with special exercises and a banquet April 13.

Personal.—Dr. Jacob H. Sieling, York, who has been ill for several weeks, was removed to his summer home in Hopewell Township, April 17.——Dr. William P. Ahearn, Susquehanna, has returned from work with the American Red Cross in Serbia.

Proposed Resolution for the Care of Insane.—Representative Dunn, of Philadelphia, introduced in the house, April 6, a resolution requiring the state Board of Charities to give a report to the next session of the legislature, a plan whereby the state can take over and support all its dependent insane. This measure is backed by charity associations.

Philadelphia

Physicians Favor Local Option.—More than 700 physicians both men and women have signed petitions to the legislature asking the passage of the local option bill.

Cancer Hospital Wing Dedicated.—The new wing of the American Oncologic Hospital, erected at a cost of $21,000, was formally dedicated April 17. The building is two stories in height and of fireproof construction throughout. Provision has been made for the eventual erection of a third story on this building and it is expected that a similar wing will be put up on the opposite side of the central building.

Rules for Infants' Homes.—The members of the Board of Health have drawn up twenty-two rules for conducting homes for children providing for the present care of the children as well as for their physical surroundings. The head of every licensed boarding house for infants must keep a record of each of the children admitted, the names of parents, etc., and the homes must be inspected every two weeks.

Civil Service Examination.—The Civil Service Commission of the City of Philadelphia has the following medical position on its present schedule: resident physician, the examination for which will be held on June 2 in the City Hall, Philadelphia. Applications must be executed and sent to the Commission on the third day prior to the day of the examination. The examination is open only to citizens of the United States and residents of Philadelphia.

Physicians Favor Animal Experimentation.—An effort is being made by physicians of the city to promote the membership in the city and state of the Pennsylvania Society for the Protection of Scientific Research, whose object is to carry on an active campaign of education for the support of medical research, and animal experimentation. A resolution was adopted by the College of Physicians of Philadelphia, April 17, endorsing the program of the Society.

Women's Medical College News.—Announcement was made April 17, that nineteen of the thirty women who will graduate this year from the Women's Medical College of Pennsylvania, have been appointed resident physicians in local hospitals.——Moving pictures showing the work of the Women's Medical College will be exhibited in the Y. M. C. A. Building at the Panama-Pacific Exposition, San Francisco. The films take as their subjects the girl student as she enters college, following her through work and play to her graduation and then depicts the busy woman physician in some of the emergencies she is called upon to meet.

City Dredge in War Against Mosquito.—The municipal dredge of the department of wharves, docks and ferries, has begun to dredge away the bar at the entrance of the Swanson canal in south Philadelphia, that section of the city below Oregon avenue and between Broad street and the Delaware River. For the last year the bar has been growing and as all of the section is below the tide level, the blocking of the canal has caused it to be inundated. Realizing that these ponds of water would be a breeding place for germs and mosquitoes, the Bureau of Health and Department of Public Highways requested that the Dock Department dredge the entrance of the canal.

Correct Layettes for Infants.—Probably every physician has at one time or another realized the difficulty in having the new-born baby properly clothed. Physicians and nurses connected with the Child Federation of Philadelphia have carefully selected, as to quality, type of garment and price, three grades of layettes which will be known as The Child Federation No. 1 layette which will be sold at $5; No. 2 layette which will be sold at $6.50, and No. 3 layette at $20,

and they will be on sale by the various department stores. The Child Federation will be glad to send to any physician cards which will call for any of these three layettes. The Federation believes in having these layettes prepared and backed by the medical members of the Federation that a great many mothers will be saved from foolish expenditure of money for extravagant and improper garments for the baby. The Federation asks for the cooperation of all the members of the Philadelphia County Medical Society in securing the promotion of this layette. Of course it is needless to say that the Federation has no financial interest in the plan.

VIRGINIA

Personal.—Dr. Roy K. Flannagan, Richmond, has been appointed assistant commissioner of health of Virginia, succeeding Dr. Allen W. Freeman, Richmond, resigned to accept the position of epidemiologist in the United States Public Health Service.——The office of Dr. Joseph G. Bishop, Galax, was destroyed by fire, April 4.

Graduating Class Will Render First Aid.—Arrangements have been made by the chairman of the medical committee of University of Virginia that the entire graduating class of the Medical College of Virginia, Richmond, will form an ambulance corps and care for any of the Confederate veterans who may require first aid during their coming reunion.

Beriberi on German Vessel.—Under date of April 11 it was reported that on board the *Kronprinz Wilhelm*, the German converted cruiser and sea raider, which was compelled to put into Newport News, there were sixty-six cases of beriberi among the crew of 500 men. The vessel had been on the seas for more than eight months without touching at any port and was short of proper provisions.

Superintendents Reelected.—The general hospital board of the state, at its annual meeting at the State Epileptic Colony, Amherst County, April 15, reelected all hospital superintendents as follows: State Epileptic Colony, Dr. Albert S. Priddy; Southern State Hospital, Marion, Dr. John C. King; Central State Hospital, Petersburg, Dr. William F. Drewry; Eastern State Hospital, Williamsburg, Dr. George W. Brown, and Western State Hospital, Staunton, Dr. Joseph S. De Jarnette.

Sanatorium for Colored Consumptives.—The Negro Organization Society of Richmond is cooperating with the Virginia Antituberculosis Society to raise $15,000 to build a sanatorium for colored sufferers from tuberculosis. It is proposed to buy a farm of 200 acres as a site for the sanatorium and during the summer to build at least two units accommodating forty patients. As the first step toward the raising of this amount, a tag sale was held in all cities, towns and hamlets of the state, March 27.

WISCONSIN

Hospital News.—The contracts for the construction of the Wisconsin Deaconess Hospital, Green Bay, has been awarded to the Appleton Construction Company for $65,000.——Drs. Ansly D. and Floyd E. Shearer, Edgerton, have made plans for the erection of a hospital in that place.

Surgeons to Meet in Milwaukee.—The clinical session of the Wisconsin Surgical Association will be held at the Hotel Pfister, Milwaukee, May 5 to 7 under the presidency of Dr. Alfred H. Levings, Milwaukee. The afternoons are to be devoted to clinical work and papers and reports of cases will be read in the evenings. The annual banquet will be held on Thursday evening.

TENNESSEE

Building Given to Vanderbilt.—It is reported that the building formerly occupied by the medical department of the University of Nashville, has been purchased by Mr. William Litterer and has been donated to the Vanderbilt University. The building is said to represent, at a conservative estimate, about $50,000. It is to be remodeled and used for teaching and research work in bacteriology.

New State Association Officers.—At the eighty-second annual meeting of the Tennessee State Medical Association held in Nashville, April 13 to 15, the following officers were elected: president, Dr. Edward C. Ellett, Memphis; vice-presidents, Drs. Julian G. Price, Dyersburg, for western Tennessee; R. E. Lee Smith, Doyle, for middle Tennessee; and Joseph W. Johnson, Chattanooga, for eastern Tennessee; secretary, Dr. Olin West, Nashville; treasurer and trustee of the Association Journal, Charles N. Cowden, Nashville, reelected; delegate to the American Medical Association, Dr. Jere L. Crook, Jackson; alternate, Dr. J. McC. Hogshead, Chattanooga, and councilors, Drs. Samuel M. Miller, Knoxville; W. Scott Farmer, Cookeville; Joseph F. H. Gallagher, Nashville; Alexander B. Dancey, Jackson, and James L. Andrews, Memphis.——A new department of ophthalmology was created and Dr. Gies C. Savage, Nashville, was elected president; Dr. Newton C. Steele, Chattanooga, vice-president, Dr. Octavius Dulaney, Dyersburg, secretary. Knoxville was selected as the next place of meeteing.——On Wednesday evening the annual banquet was held at the Tulane Hotel, and was unique in that there was no toastmaster nor were there any after dinner speakers.

CANADA

Hospital Fire.—The Lakeside Home or Hospital for the Sick Children's Hospital, situated on Toronto Island, was destroyed by fire on April 23. The loss is estimated at $100,000; insurance $35,000. The summer home was a gift to the Sick Children's Hospital by Mr. John Ross Robertson. It is stated that the hospital will be rebuilt immediately.

Fraternalists Meet.—At the annual meeting of the Canadian Fraternal Association in Toronto, April 22 and 23, Dr. John Ferguson, editor of *The Canada Lancet*, Toronto, officiated as president, and made the presentation of a suitable testimonial to the past president, Dr. John H. Bell, Hamilton. Dr. William S. Harrison, Toronto, was elected president, and Dr. George Elliott, Toronto, chairman of the medical section.

Hospital News.—The physicians of the Medical Society of Peterboro, Ont., have completed the details of the organization of a base hospital unit for the front in any part of Europe where needed, including Serbia, with nine physicians and one dentist, that being the number of qualified physicians in that city for the army medical corps. Fifteen trained nurses have offered their services. The Canadian government has accepted the offer of this hospital. The physicians remaining at home will pay $50 per month, the lawyers a similar sum and the balance will be contributed by the citizens for the equipment of this hospital.

GENERAL

Warning.—Dr. J. E. Jorris, Minneapolis, has reported to the police that a well-dressed man purports to be a member of an organization of locomotive firemen and visits physicians' offices with notification of the appointment of physicians as examiners for his trade union. He asks a loan and is also said to have stolen small articles from the physicians' offices.

Grenfell's Work in Labrador.—At the annual meeting of the International Grenfell Association held in New York, April 13, a broadening of the scope of the mission work among the fishermen of Labrador was indicated. During the last year the hospitals and missions of the association treated 7,345 patients, and $66,839 was expended for medical and mission work.

To Investigate Diseases in the Far East.—Dr. Samuel T. Darling, Ancon, C. Z., for ten years a member of the medical staff of the Panama-Canal Zone, has resigned as chief of the laboratory to investigate disease in the Far East for the Rockefeller Foundation International Health Commission. Dr. Darling sailed from New York on the *Adriatic*, April 21, for Liverpool on his way to Singapore.

Urologists Elect.—At the fourteenth annual meeting of the American Urological Association held in Baltimore, April 13-15, St. Louis was determined on as the next place of meeting and the following officers were elected: president, Dr. Edward L. Keyes, Jr., New York City; vice-president, Dr. E. Otis Smith, Cincinnati; secretary, Dr. Henry L. Stanford, Cleveland, and treasurer, Dr. James A. Gardner, Buffalo, N. Y. (reelected).

Bequests and Donations.—The following bequests and donations have recently been announced:

Medical College of South Carolina, Charleston, a donation of $1,000.00 by Mrs. Salina Huger, Charleston, in memory of the late Dr. William Harleston Huger.

Long Memorial Hospital, Indianapolis, an additional gift of $10,000. by Dr. and Mrs. Robert W. Long, Indianapolis, making their entire donation up to date, $240,000.

Boone County, Ind., Hospital, a donation of $15,000. by Mr. F. J. Witham and the Board of County Commissioners of Boone County, $15,000.

White Plains, N. Y. Hospital, St. Luke's Hospital and German Hospital and Dispensary, Manhattan, and White Plains Nursing Association, each $1,000.00 by the will of Henry Ungrich.

Association of Medical Museums Meeting.—The eighth stated meeting of the American Section of the Association of Medical Museums was held at Washington University Medical School, St. Louis, April 1, under the chairmanship of Dr. Aldred S. Warthin, Ann Arbor, Mich. The program of the meeting was included under the heads of "Museum Technique," "Microscopic Technique," "Illustrative Medical Teaching" and "Museum Research." A number of special exhibits was also demonstrated.

Sanitary Equipment at the Panama Exposition.—Under the direction of Surgeon Claude C. Pierce, U. S. P. H. S., in charge of the sanitary supervision of the Panama exposition at San Francisco a census of the employees and a sanitary survey of the grounds and buildings have been made. There are 199 buildings and 401 employees under sanitary supervision, exclusive of the guards. Up to March 31 most of the employees had been inoculated against typhoid fever. The water plant of the grounds consists of pumps for pumping ground water into wooden reservoirs above the ground, and from these the water passes through sand filters and is afterward treated with chlorin. The water is then pumped to the reservoir from which it is distributed to the grounds and buildings. Cases of communicable diseases are promptly isolated. Measures against flies consist in treating all material in which flies might breed with a mixture of phenol, resin and caustic soda and their removal at short intervals. Restaurants are provided with garbage cans with tight covers which are taken away every night and the garbage incinerated. Special attention is given to food sold on the grounds to see that it is of wholesome quality.

FOREIGN

Honors for Dr. Kinnear.—Dr. Hardman N. Kinnear of the hospital at Foochow, China, conducted by the American Board of Foreign Missions, who is now in America on furlough, has been given a medal and the decoration of the Sixth Order of Chia Ho by President Yuan on behalf of the Chinese government "in recognition of valuable services in connection with relief work during the revolution." The hospital has 100 beds and the staff consists of two American physicians, one American nurse and six Chinese assistants. During the last year the surgical operations were 900 major, 95 minor; 34,915 treatments were given in the dispensary and 5,241 new patients were attended. The station was opened in 1847. Dr. Kinnear has been at the Foochow hospital since 1889.

WAR NOTES

Wheat Starch in Prescriptions.—Unna's *Dermatologische Wochenschrift* appeals to the patriotism of German physicians, and especially the dermatologists, to refrain from ordering wheat starch in prescriptions for external use. It gives formulas in which the usual wheat starch is omitted in favor of talcum, saying that hundreds of pounds of wheat will thus be saved to the country.

The Flood of "Experiences at the Front."—The *Deutsche medizinische Wochenschrift* warns the 20,000 medical men in army work that its capacity is limited, and that it is impossible to publish the hosts of articles being sent in on "trench foot," "skull wounds," etc. Even if space permitted, the supply of ink would soon run out, to say nothing of paper. The space in the weeklies has been much reduced, and publication even of extremely timely articles may have to be delayed unless all are cut down to the shortest limits.

Russia Appeals for More Physicians.—According to a communication in the *Frankfurter Zeitung*, the president of the Russian Red Cross has telegraphed to the presidents of the Swedish and Norwegian Red Cross asking whether they could not send physicians to Petrograd to serve in the military hospitals. The replies stated that no army or navy medical officers could be detailed for the purpose. A German exchange states further that all Russian physicians now serving under the Red Cross outside of Russia have been summoned home.

Contributions to British Journals Short.—The *Journal of Obstetrics and Gynecology* of the British Empire has just issued a quarterly number, covering the months of October, November, and December, 1914. In an editorial it states that "The war has brought about such a great falling-off in the material for publication that the editor has been compelled to issue the present quarterly number, instead of three separate numbers. He hopes that this falling-off has been only of a temporary nature, and intends to make every effort to publish in full the usual monthly numbers." In discussing the reasons for this action, he says: "It is not a time when members of the profession, in whatever capacity, are able to settle down to reflective scientific work and to write original articles. It is interesting to note that a number of journals are publishing articles by American writers in somewhat greater profusion than has been the case in the past. And judging from some of the material the editors have not been overly strict in making their selections."

Aid for Belgian Physicians.—The report of the treasurer of the committee of American physicians for the aid of the Belgian profession, for the week ending April 24, 1915, lists the following contributions:

Dr. George Crile, Cleveland, Ohio	$ 100.00
Salt Lake County Medical Society, (Third contribution), Salt Lake City	21.00
Dr. C. P. Thomas, Los Angeles, Cal.	5.00
Portland Medical Club, Portland, Me.	25.00
Dr. C. H. Henninger, Pittsburgh, Pa.	5.00
Dr. J. J. Buchanan, Pittsburgh, Pa.	25.00
Receipts for the week ending April 24th	$ 181.00
Previously reported receipts	6,324.50
Total receipts	6,505.50
Disbursements for the week ending April 24—	
80 Standard boxes of food at $2.30	$ 184.00
Previously reported disbursements—	
1,625 Standard boxes of food at $2.20	$3,575.00
1,194 Standard boxes of food at $2.30	2,746.20
Total Disbursements	6,505.20
Balance	$ 0.30

Through an error in the report of April 17th, the contribution of the Bennington County Medical Society, Bennington, Vt., was credited to the secretary, Dr. Lucretius H. Ross.

F. F. SIMPSON, M.D., Treasurer,
5 Jenkins Arcade Bldg., Pittsburgh, Pa.

The "Deathbed" of the Tabloids."—Under this heading, *Am Totenbett der "Tabloids,"* the *Therapeutische Monatshefte* comments on the efforts in Germany to discontinue the use of British proprietaries and especially of the "erstwhile so popular English miniature tablets." The Apotheker-Verein offers its services to physicians to help them to select equivalents, made in Germany, for foreign proprietaries, and has published lists of available substitutes. Our exchange continues: "This movement is a political as well as a patriotic necessity. But the same patriotic motives can scarcely be ascribed to the numerous German manufacturing chemists who, swimming stoutly with the tide, have sought protection for and registered an equal number of trademark names. Instead of the single term 'tabloids' eight new names have been registered, 'comprets,' 'primoids,' 'puroids,' 'tablettidae,' 'tablonettes,' 'trochoids,' 'tabletten marke Hageda' and the tablets put out by a syndicate with the initials of the firm composing it, 'M. B. K.' The *Pharmazeutische Zeitung* offers still another term 'piluloids.'" The editorial continues: "Hence the otherwise gratifying crowding out of a foreign-made pharmaceutical leaves us little to rejoice over, as it brings with it these disagreeable side-issues. At the same time, it may be as well that institutions which lead to such consequences are thus carried to ridiculous extremes. The suggestion that the fancy names 'amphiols' or 'amploid' be used instead of the term 'ampule,' is another step in the same direction."

An Appeal for Surgical Aids for Provincial Hospitals in France.—The presence of 500,000 wounded, scattered not only through the great hospitals in larger cities, but also throughout the provinces in many country towns and villages of France has necessarily placed an intolerable strain on the medical resources of these little places. The hospitals, situated often in a school, hotel or factory, usually are furnished with beds by the neighboring population. The government provides some twenty-five cents a day for the food of each wounded man and leaves them to the mercy of communes. These "hospitals" are usually found to be practically destitute of all medical supplies, except perhaps a small quantity of rough cotton and anesthetics. Untrained women of all classes form the nursing staff with local chemists or practitioners in charge. A military surgeon visits them at varying intervals; should any operation be necessary in his absence it is usually done by the superintendent or a medical student with any instruments to hand. There are stories of the use of jackknives and even automobile tools, and these appear by no means incredible to anyone who has seen the appalling condition of many of these crowded hospitals.

The French Wounded Emergency Fund has been started to provide for the needs of these poorer temporary institutions. It is already sending supplies by a system of service—motor transport—sending supplies to over 225 hospitals in Normandy and Brittany, and it is proposed that an American branch should take in hand a similar organization for the Southern and Southwestern provinces, operating from Bordeaux as a base.

Surgical dressings are constantly needed and also surgical instruments of all the commonest and most useful kind. The French Wounded Emergency Fund therefore appeals to all surgeons and surgical hospitals throughout America for any recently discarded instruments that would prove a godsend to the hospitals that have none.

Cases should be sent to the local chapters of the Red Cross Society, addressed for the French Wounded Emergency Fund, and they will ship them to New York; or to the same name at 38 West 39th Street, New York.

FROM SIR WILLIAM OSLER

OXFORD, APRIL 9, 1915.

Medical Notes on England at War

THE VOLUNTEER ARMY

For England the war has hardly begun. There is but little fighting at sea, and her armies are only in training. The material is first-class, as the average Englishman is of the bull-terrier type and a born fighter. All he needs is instruction in modern methods. The whole country is in khaki—soldiers everywhere. It is wonderful what six months' training has done for the men. We have had an average of from 6,000 to 7,000 in Oxford, and I have had many opportunities to watch the development of a body of strong citizen soldiers. The transformation makes one realize how much compulsory service would stiffen and strengthen the physique of men, but it is never likely to be a popular measure in this country. To have raised voluntarily an army of 2,000,000 is itself a tribute to the democratic spirit and to the individualism which is so characteristic of British civilization. Billeted in houses and carefully looked after, the sickness rate has been low, in spite of an exceptionally bad winter.

The colleges here and at Cambridge are depleted. Last term there were scarcely 1,000 in residence out of more than 4,000; this term there will not be 500. And the heavy toll of young lives is beginning. Already we have lost at Christ Church, my college, twenty out of a student body of about 280. Irrespective of nationality, we may

> Salute the sacred dead
> Who went and who return not.

But there is a singular pathos in the loss of the bright young lives of the undergraduate band—a pathos which inspired Lowell in his famous ode, well called the high-water mark of American poetry:

> I see them muster in a gleaming row,
> With ever-youthful brows that nobler show;
> We find in our dull road their shining track;
> In every nobler mood
> We feel the orient of their spirit glow,
> Part of our life's unalterable good,
> Of all our saintlier aspirations;
> They come transfigured back,
> Secure from change in their high hearted ways,
> Beautiful evermore, and with the rays
> Of morn on their white Shields of Expectation.

THE AMERICAN HOSPITAL, PAIGNTON

A week at Paignton enabled me to see thoroughly the work of the hospital, which is first class. A beautiful new ward for between sixty and seventy beds has been opened in the circular riding school, and a laboratory has been organized in charge of Dr. W. B. Crumley from the Mayo Clinic. The hospital has been opened for just six months. Dr. Beal, the surgeon-in-chief, has given me the following statement:

Number of cases admitted	1,060
Number of deaths (0.3 per cent.)	3

(The first was from a wound of the spine, the second a shell wound of the scalp, and the third acute Bright's disease.)

Number of gunshot wounds	225
Number of shrapnel and shell wounds	208
Number of fractures	115
Number of frost-bites	153

The thigh was the part of the body most frequently injured; there were twenty-nine gunshot and shrapnel wounds of the chest, ten of the abdomen and ten of the skull.

It is interesting to note that there were only three bayonet wounds.

Among medical infections there were five cases of pneumonia, two of typhoid and two of tetanus, and all the patients recovered.

So far as England is concerned, the most remarkable feat of the war has been the transportation, the organization of which has been thorough and efficient. A just tribute was paid to it in the House of Commons recently, when emphasis was laid on the fact that thousands, now hundreds of thousands, of troops have been moved silently and quickly without loss of life across the channel and from distant parts of the empire. The transport of the wounded has also been very thoroughly arranged, and I was glad during my visit to witness the arrival of a new group of patients. Word came that the Red Cross train was due at Paignton station about 3:30. On the platform the ambulances for the cot cases and various conveyances for the others were in attendance. A group of Boy Scouts arranged the stretchers and a detachment from the Royal Army Medical Corps, in training near by, was lined up to act as bearers. Nothing could be more admirable than the ease with which the wounded were handled. Within an hour from the arrival of the train all the patients were in bed, though among them were thirty cot cases requiring careful treatment. The men had come from the battles about Neuve Chapelle and had been transferred through Boulogne and Southampton.

The personnel of the hospital has changed slightly since my last letter. Dr. Eastman has gone to a hospital at Pau, France, and Dr. Shaw and Dr. Leonard have returned to America. Dr. Hinds, who is second in charge, is leaving shortly for the queen of the Belgians Hospital, Lapanne. The present staff is: Dr. Howard Beal of Harvard and Worcester, Mass.; Dr. R. W. Hinds of Harvard and Buffalo; Dr. Fitzsimons, New York and Kansas; Dr. W. G. Crumley of Rochester, Minn. (Mayo Clinic); Dr. Gilcreest of Gainesville, Texas, and of the Johns Hopkins; Dr. Stowers of Millersburg, Mo., of the John Hopkins, and of the Royal Victoria Hospital, Montreal, and two new men are expected, Dr. Dykes from Georgia and Dr. Lange from Rhode Island.

CHEST WOUNDS

The next day I had a unique experience, examining in succession, nine wounds of the chest, seven complete perforations with bullets, one shrapnel bullet lodged in the lung, and one fragment of a shell which had also penetrated the lung. They illustrated the inefficiency of the modern rifle as a weapon of war. These men had been wounded within a fortnight, yet all were up and about, without fever, practically without cough or other symptoms, and with very few physical signs! The wound of entrance in all was small and healed; the wound of exit a little larger and healing. In one, the bullet entered the sternum half an inch from the junction of the third right costal cartilage, and from the position must have gone through the right auricle, and the exit was through the lower end of the scapula. The man had hemoptysis and an irritating cough for some days, but these gradually disappeared. There was impaired resonance at the right base, but no fever, and he said he felt perfectly well. In another case the bullet entered the right clavicle 1½ inches from the sternum, passed obliquely upward through the neck and came out at the fold of the left trapezius. He had a little difficulty in swallowing for a couple of days, but has since had no symptoms. It is marvelous how it could have escaped the great vessels and the windpipe. In the shrapnel case the fluoroscope showed the bullet lodged in the left lung, and there was a difference in its position between deep inspiration and forcible expiration of at least 3 inches. He, too,

had no symptoms, and only signs of slight impairment of resonance and feeble breath sounds. Of the twenty-nine cases of bullet or shrapnel wounds of the chest, there was recovery in all. Only one patient had acute pleurisy—a man with a very severe shrapnel wound with fracture of the ribs in exit. When I saw him on my first visit he had high fever, foul septic pleurisy and evidence of a wound of the œsophagus, as portions of food had been coughed out through the opening in the chest. He looked in a desperate condition, but with drainage and irrigation he gradually recovered. The wound has now healed and he has gained 15 or 16 pounds in weight and is ready for discharge. Only two of the cases had extensive hemothorax requiring aspiration. One had 1,000 c.c. of blood drawn off, and the other 500 c.c. at one and 900 c.c. at a second tapping. Several of the cases had slight temperature for a week or ten days. In the nine cases examined it was interesting to note the uniform character of the physical signs—slightly defective expansion with impairment of percussion note on the affected side; diminished breath sounds; in all but one tactile fremitus was present, though less marked than on the normal side; in no instance was there pleural friction, and neither pneumothorax nor acute pleurisy had followed. The contrast between gunshot wounds in the recent and former wars is very striking. In the Civil War the death rate was more than 62 per cent., and in the Crimean War above 80 per cent., even in the Spanish-American War it was 27 per cent., while in the Japanese War in 945 cases it was only 3.67 per cent. The mortality in the present war may be still lower.

ARTERIOVENOUS ANEURYSM

There are great opportunities in this war for the new vascular surgery, as wounds of arteries are common. Arteriovenous aneurysm is a rare affection in civil life. At Philadelphia and Baltimore I saw only five cases of the external vessels, and now within a period of a few months I have seen an equal number: Two at Paignton, in one of which Dr. Beal did an Antyllus operation; one at Chester with Mr. Wright, and the other day I held a symposium with some members of the staff of the Base Hospital on two cases at the Radcliffe Infirmary. The Chester case presented a physical sign that I cannot find noted, namely, a palpable and audible pistol-shot sound, such as one hears and feels in aortic insufficiency. The bullet entered the lower end of the popliteal space, and in addition to the thrill and loud machinery murmur, the slightest touch over the tumor felt the shock of the sound, and the same could be heard not only over the area of pulsation, but widely spread up the femoral vessels. There was no aortic insufficiency. At operation it turned out to be a simple aneurysmal varix, and Mr. Wright ligatured the artery above and below and sutured the orifice into the vein. The rapidity with which the collateral circulation is established is illustrated by the second Paignton case, also popliteal. Less than two months after the injury the femoral artery on the affected side could be felt to be much larger and with a much more forcible pulsation, and while there was no pistol-shot sound over the aneurysm itself, it was marked along the femoral and could be heard without any pressure above and below Poupart's ligament. An Esmarch bandage was applied above the knee and the femoral artery, then compressed in Hunter's canal; the anemia of the skin of the leg and foot was completely abolished within a minute, while on the same leg with the same procedure, the anemia did not disappear until just three minutes. While arteriovenous aneurysm of the vessels of the neck and arm may last for years without serious trouble, in the leg the effects of stasis become serious and the venous engorgement leads to progressive disability. With the great improvement in the modern technic, the risk of thrombosis—the chief menace of the surgeon—should be reduced to a minimum.

SOLDIER'S HEART

The irritable heart, so well described by Da Costa in the Civil War, has not been very common. The symptoms are very characteristic—palpitation, pain, particularly on exertion, slight shortness of breath; the physical signs—diffuse apex beat, systolic murmur heard at apex and along the left sternal border, loudest at the pulmonic area, lessening or disappearing entirely in the erect posture, and often associated with marked vasomotor disturbances. The condition is brought about by overexertion, combined with too much tobacco, and very often sexual excesses. In many instances it is the simple neurasthenic heart, and the cases recall the many struggles I have had at Washington with the Army and Navy departments on behalf of perfectly good lives turned down for just such signs as I have mentioned. I remember once the secretary of the Navy saying to me: "But, professor, you say there is a murmur. That settles it. We cannot have an officer who has trouble with his heart, however slight."

There have been reports of remarkable cases of men with organic disease standing the heavy work of the campaign and the trenches. But there is another side. I have seen two old soldiers with aortic insufficiency knocked out completely who never should have been taken from the reserve. An officer whose case I have followed for some years was rejected five years ago—and quite rightly—by an army board for aortic insufficiency, but has remained so fit that at the outbreak of the war he was given a command. He was able to do a hard day's work and his physical condition was excellent; but three months later I saw him with chronic infectious endocarditis, and he is now in the fourth month of his fever.

TYPHOID FEVER

It is very gratifying to have got through seven months of the war without a single serious outbreak of typhoid fever. There has been very little in the camps in England, and the entire cases abroad have never been more than from 150 to 200 at a time in the entire force. There has been a constant fight with the "anti's," who have been very active in circulating most pernicious literature, but in spite of their efforts 99 per cent. of the men have been vaccinated. It is interesting that a number of cases returned from the front have been paratyphoid, and I would like to refer bacteriologists interested in the subject to the papers by Dreyer and his colleagues at the Oxford Pathological Laboratory, which appeared in the *Lancet* of this year, in which they describe certain new methods for the detection and identification of the typhoid and paratyphoid bacilli.

CEREBROSPINAL FEVER

The outbreak has followed its usual course: numerous small foci throughout the country, nowhere an extensive epidemic. The region of Salisbury, which has suffered most severely, had only about fifty cases in the civil population. The type has been severe, and it is evident that the serum used has not been efficient. I am glad to hear from Dr. Flexner that he is forwarding a special supply, as there is no question as to the satisfactory results obtained, particularly in Belfast, during the last epidemic. The question has not yet been settled as to the responsibility of the Canadian troops for the outbreak. I hear from Dr. Robb of Belfast that there were certainly cases in that neighborhood in which no contact of the patients could be traced either with Canadian soldiers or with those who had been in contact with them. After all, the sporadic disease is always present, and the conditions during the winter have been ideal for the outbreaks.

LONDON LETTER

LONDON, APRIL 10, 1915.

The War

THE MEDICAL NEEDS OF THE ARMY

The War Office is finding some difficulty in obtaining the large number of surgeons required for the new army, although many responses have been received to the director general's appeal to all who are willing and able to serve their country at this crisis. Of course, it is not possible for more than a certain proportion of physicians to give up their work. The suggestion has been made in several

quarters, and by the British Medical Association in particular, that many men engaged in civil practice which they could not relinquish would be quite willing to devote some hours daily to army work. Such part-time service would certainly have the advantage of releasing for active service army surgeons employed at the depots in this country. At a meeting of the special committee of chairmen of standing committees of the British Medical Association, Sir Alfred Keogh, director general of the army medical service, made the following important statement: The civil medical profession has given the army so much generous and self-sacrificing assistance since the outbreak of the war that he regretted to be compelled to make further demands on it. But it is necessary to look ahead and make adequate provision to safeguard the health of the home army when the expeditionary force is increased in strength to such an extent that every commissioned medical officer fit for active service will be required on the continent. It is anticipated that this increase will take place in the course of the next three or four months, so that the call on medical resources is urgent. Sir Alfred Keogh suggested the following means by which the civil practitioner could come to the aid of the army: He urged all those under 40 who were fit for active service to apply for temporary commissions in the army if their civil obligations would allow this. Such men would have an opportunity of seeing active service on the continent or elsewhere where we have fighting armies. The army is especially in need of young general practitioners who are willing to go anywhere and do anything in the way of duty with troops or with medical units. There are also vacancies for men who have specialized in surgery, bacteriology, medicine, Roentgen-ray work and ophthalmic surgery. They would probably eventually be appointed to the large hospitals of 1,040 beds each which are being fitted out for service with the expeditionary force, but they would be required to do a certain amount of work in a military hospital in this country first, so as to become familiarized with the routine of a military hospital. Men over 40 are not being sent abroad at present, but their services will be of the greatest value to the military authorities in this country, and many of them would probably go overseas for hospital work later on. Men who on account of age, health or local obligations are unable to accept these larger responsibilities he divided into three classes. 1. Those who can give so many hours a day to military work and give a certain fixed time on each day. These men would be a great help in doing work in military hospitals, seeing men in combatant units reporting sick with minor ailments, and looking after sanitation of camps, barracks and billets. 2. Men who could not devote a specific time to military work, but who would be willing to attend the wives and children of officers and soldiers as part of their general practice at good rates of pay. 3. Men who could arrange to help the neighboring practitioners who have undertaken military duties, and who would do so without encroaching on their practices, and under terms which would have to be settled by mutual agreement.

THE DRINK PROBLEM

The difficulty of producing munitions of war, which is partly due to the drinking habits of a certain proportion of workmen who are earning unusually good wages, has been mentioned. The question has become a burning one. Following the offer made by the king, which I reported, he has now ordered that no wines, spirits or beer shall be consumed in any of his houses. Lord Kitchener, the war minister, has given similar orders in his household, and so have many public men. A memorandum on practical temperance reform has been sent to the Chancellor of the Exchequer, Mr. Lloyd George, signed by leaders of the medical profession, the churches, the universities and other prominent persons. It is pointed out that temperance reformers are agreed that the circumstances of the present war afford an unprecedented opportunity—and one that is not likely to recur—for pressing to a satisfactory conclusion proposals which, although they have, in one form or another, been before the public for many years, have never attracted the serious attention which they are receiving today. "Prohibition" has been looked on in the past as the visionary ideal of a group of well-meaning enthusiasts whose methods of urging their case have not always appealed to the business instincts of the practical man. It is now, however, beginning to be realized that too much importance has been attached to the plausible formula which declares that you cannot make men sober by act of parliament. Only eight months ago Russia, from being one of the most drunken nations in Europe, automatically and at once became a people of almost total abstinence. It is prohibition—necessarily enforced by law—that has worked this miracle. This amazing fact, and the beneficent consequences which have resulted from it, have excited the admiration and fired the imagination of the British people, more especially since they have learned that since the czar decreed this great reform the prosperity of the Russian people has advanced by leaps and bounds. M. Bark, the Russian minister of finance, has declared that since the prohibition of vodka, the productivity of every class of workman in Russia has increased from 30 to 50 per cent., while crime had everywhere diminished, and in some districts had disappeared altogether; and that, notwithstanding the war, the excess of deposits over withdrawals in the savings banks amounted at the end of 1914 to twice the total of the preceding year. France, like Russia, has by prohibiting the sale of absinthe seized the occasion of the war to reform the habits of her people. Is it fair that when our allies are sacrificing so much we should hesitate to take steps essential for the fullest efficiency of our armies? Since the beginning of the war, representations have been made with ever-increasing insistence by societies, associations and by all sorts and conditions of men imploring our government to take advantage of the present party truce to induce parliament to do for Britain, as far as may be practicable, what the edict of the emperor has done for Russia. The only legislative response thus far vouchsafed by the government is represented by emergency measures giving certain discretionary powers to military and other authorities. These measures are admittedly inadequate, while lack of uniformity in their administration has rendered them practically useless for the protection either of our troops or of the civil population against temptations which are obviously even more disastrous in their consequences when the nation is at war than under ordinary circumstances. Total, immediate and universal prohibition is impracticable in this country, even at the present time; but an act making Sunday closing compulsory, with a uniform and rigorous curtailment on other days of the business hours of all saloons, the compulsory closing of such as are situated in the vicinity of military camps and barracks, and prohibiting the granting of new licenses during the continuance of the war would undoubtedly justify by its results the concession of compensation to the saloonkeeper for the loss of his means of livelihood. In the case of earlier closing or later opening, the compensation would be strictly limited to the actual amount by which the average profits of the house were reduced as a direct consequence of the curtailment of its hours, while full compensation would be payable in respect of the entire closing of a house in the interests of the troops. It is generally admitted that the evil is principally due to the drinking of spirits, which unfortunately has been encouraged by recent war legislation.

In regard to the war taxes, they are mostly raised by increased income tax, which is borne entirely by the middle and upper classes. In order to throw a small part of the burden on the working class, the tax on beer was increased to the extent of 2 cents per pint. The increased cost of the beer has encouraged the drinking of spirits. So far the government has not come to any decision, but it is considered that all-round prohibition will be ruled out as impracticable and uncalled for at the very beginning, and that the measures adopted will take the form of (1) prohibition of wines and spirits; (2) encouragement of lighter beers by a compulsory reduction of strength, and (3) further restrictions on the sale of intoxicants in military areas and in districts in which munitions of war are being manufactured.

PARIS LETTER

PARIS, April 8, 1915.

The War

CHANGE IN THE UNIFORM OF ARMY SURGEONS

A recent ministerial circular modifies the uniform of army surgeons, particularly by suppressing the distinctive insignia which until now have distinguished army surgeons the same as officers of the line of equal rank. This circular is naturally displeasing to the medical corps, and the different professional groups are making an effort to obtain a suppression of the ministerial decree. At the last meeting of the Académie de médecine de Paris, Dr. Rouvillois rightly remarked on the fact that it may seem strange to desire a diminution of the respect and authority of military surgeons compared with

the army officers by introducing a modification in their uniforms which will have the effect of lowering them and putting them in a second class at a time when the regular military surgeons and the civil surgeons in the service are united at the front with the same thought and the same habits of duty and of patriotic self-sacrifice, giving the example of devotion pushed to the point of sacrifice. Like other officers, physicians are exposed to fire in battle. They are, besides, exposed to the most serious epidemics. They face, therefore, a double danger which produces for them a special risk of sickness and a mortality equal if it is not greater than that of the actual fighters. Facing equal risks, they are also equal in law; they ought therefore to be equal in fact, and to possess the privileges, prerogatives, honors, designations and distinctive insignia attributed to officers of the rest of the army.

DISCHARGE OF THE WOUNDED AND SICK FROM THE ARMY

Some deputies have had the singular idea of laying before the chamber of deputies a proposition requesting the government to authorize, by a general regulation, the daily discharge from the army of the wounded and sick who are being cared for in the medical institutions and hospitals with the single exception of those who are affected with contagious diseases. There is certainly reason to be astonished at such a proposition. This measure, if it were ever adopted, would have the effect of removing all authority from physicians, surgeons and directors of the hospitals. Aside from contagious diseases, there are wounded soldiers for whom a discharge might be extremely dangerous, and as Charles Benoist, one of their colleagues, remarked to the authors of this proposition, "You will not find a physician or surgeon of worth who will consent to continue his work for the wounded and sick if such a proposition is adopted." On the other hand, the minister of war replied that up to the present the regulations have authorized and determined the discharge of the wounded and sick, but these discharges are naturally subordinated at the same time to the opinion of the military authorities and, especially, to the advice of physicians. What the physician requests is done. It is impossible that it should be otherwise.

TREATMENT OF INFECTED AND GANGRENOUS WOUNDS

At one of the last meetings of the Société de chirurgie, Dr. Morestin, agrégé professor of the Faculté de médecine de Paris and surgeon of the hospitals, drew attention to the great benefit to be obtained from the use of solution of formaldehyd mixed in equal parts with alcohol and glycerin in the treatment of septic wounds and gaseous gangrene. It is evident that in these cases the first indication is always a free opening, and the debridement of all the foci. Among the antiseptics that are then suitable to apply to these large septic wounds, solution of formaldehyd is incontestably the one which has the most energetic action. It constitutes a genuine embalmment of the tissues which permits, in the case of limbs that must be sacrificed, the delaying of the amputation to the moment when it can be done with the least danger. It is necessary, however, to state that the use of formaldehyd is not free from disadvantages. The application is painful and it produces the death of the tissues, which may render it dangerous, especially in the neighborhood of large vessels, if its contact with them is too intimate and too prolonged. It is necessary, therefore, to guard its use; but in spite of these disadvantages, solution of formaldehyd still remains a disinfecting agent of the first order.

On the other hand, at the meeting of the same society, Dr. Dionis du Séjour praised the good effects of a 15 per cent. aqueous solution of oil of turpentine on very infectious wounds where there is an abundance of necrotic tissue. The effects of oil of turpentine are manifested immediately following its application by an almost complete deodorization of the wound by a rapid disappearance of the gas which it contains and by a rapid fall in the temperature. In the days that follow, it is noticed that the necrotic parts (cellular tissue, muscles) are rapidly eliminated. Only the tendons and the fascia take a longer time for its elimination; moreover, it is a good plan to assist this elimination by cutting away with a scissors the parts that are most mortified. The employment of oil of turpentine has given its best results in cases of diffuse phlegmons. In gaseous gangrene, properly so called, in serious contused wounds with abundance of necrotic tissue, Dionis du Séjour could obtain not only the survival of the wounded but also the preservation of limbs badly compromised. Lavage with oil of turpentine has given excellent results in cases of infected joints and in emptying bone cavities in osteomyclitis.

THE MONUMENT TO REYMOND

I noted in a preceding letter the formation of a committee for the erection by a public subscription of a monument to Dr. Emile Reymond, who died a tragic death in the course of a reconnaissance in an aeroplane (THE JOURNAL, Nov. 21, 1914, p. 1868, and April 3, 1915, p. 1174). The subscription has already yielded more than $1,600 (8,000 francs). The execution of the monument has been entrusted to the noted sculptor, Bartholomé.

PATHOGENESIS OF ANAL FISTULA

At the meeting of the Académie de médecine, March 30, Dr. Paul Reynier, surgeon of the hospitals of Lariboisière, commented on the dangers which result from a bad habit in infancy and continue to adult age of swallowing tracheal mucus. This habit, unfortunately, is more widespread than would be believed. It exists especially among fashionable women who regard spitting in public as an act of impoliteness. Now this mucus contains germs and too often tubercle bacilli. These bacilli are not destroyed by the gastric and intestinal juices. They may inoculate the tissues in their course and cause, for example, tuberculous enteritis and especially anorectal fistula. In Reynier's opinion, as well as that of many of his colleagues, anorectal fistula may be considered, in the majority of cases, as a lesion arising from tuberculosis. Among sixty-seven patients observed, he found in sixty the coexistence of pulmonary tuberculous lesions which had preceded the appearance of a fistula. On the other hand, by questioning all these patients, he established their bad habit of swallowing their sputum.

BERLIN LETTER

BERLIN, March 30, 1915.

The War

DEATH OF PROFESSOR CORNET

Typhus fever has again claimed from the German medical profession a valuable victim. The tuberculosis investigator, Professor Cornet, died in Berlin, March 27, aged 56, from an infection which he had incurred in a prison camp. In the spring of 1885 he devoted himself to tuberculosis, when he became assistant at the renowned Brehmer institute in Görbersdorf. Later he worked with the hygienic institute and from 1891 in the institute for infectious diseases under Robert Koch, under whose direction he succeeded in obtaining the evidence that tubercle bacilli are not unlimited in their distribution but are practically to be found only in the neighborhood of patients with open tuberculosis. This discovery has become of the greatest importance in the prophylaxis of tuberculosis. Of especial interest were his investigations regarding the distribution of tuberculosis among nurses in which the transmission of tuberculosis from one human being to another was considered. The same investigation was served by his works on tuberculosis in penal institutions. The results of all his studies and practical experience he included in two large monographs on tuberculosis and scrofulosis which appeared in Nothnagel's collection. Cornet practiced during the summer months at Bad Reichenhall.

TRAINING OF ONE-ARMED PERSONS

In connection with the care devoted in such large measures to those maimed by the war, the one-armed form a special class. The idea of founding a special school for one-armed persons arose in Vienna, where the architect, Grosselfinger, soon after the outbreak of the war, came into public notice with this plan, and in the late autumn of 1914 opened his school in a reserve hospital. As for the last thirty years he himself has had only the left arm, and nevertheless since the completion of his university studies has followed his technical calling without hindrance, he well knew how to estimate the strength of will required to overcome oneself and to struggle against the prejudices of others. Thus the idea ripened in his mind of putting his experience at the disposal of the fatherland, by helping other one-armed persons to secure the possibility and comfort of carrying on a trade. In the German Empire one such school has been founded at Heidelberg. Similar arrangements have been planned in other places.

A school for the one-armed serves a double purpose. First, it is of assistance to these persons to reestablish themselves in daily life, and secondly, it enables them to carry on their trade as well as possible. When this is not to be expected,

it serves to furnish them with the knowledge and training which will prepare them for a change of occupation. In the school for the one-armed, the pupils are enjoined to manage independently all the affairs of daily life. They are expected to learn how to dress themselves, wash, shave and feed themselves. Further, physical exercises are provided to strengthen the stump and also to develop especial aptitude and strength in the sound limb. Fine and quick writing with the left hand is taught and training given also in spelling, arithmetic, stenography, typewriting, bookkeeping, drawing and other commercial arts. Most of those who are sent to these schools have lost their trained hand. They are still under medical care. Inasmuch as the preparation of the stump, and the fitting and preparing of the artificial limb require some time, the period of stay in the school (and the hospital for these cases is under the medical supervision of the Heidelberg orthopedist, Dr. Vulpius) is not exclusively devoted to instruction. The length of time they spend in the school will naturally be very different in different cases. Right-handed persons who are merely headworkers can learn in a few days the small manipulations of daily life and may then be discharged. Left-handed persons need a longer training for these simplest matters, but the dissimilarity of the life work makes a discriminating treatment necessary. Among manual laborers careful development and training is necessary.

The capability that a one-armed person with an early and energetic training can attain has been demonstrated in various places, particularly in Berlin, by the exposition of some of those maimed in the war in person or by films. That such exhibitions exercise a favorable influence on the wounded and incite them to imitation is easy to understand. In this respect, the exhibition of a man deprived of both arms who was present a short time ago in one of the hospitals of this city produced a remarkable impression. He is the original of the armless artist, Stoss, described by Gerhart Hauptmann in so striking a way in his novel "Atlantis," which is well known in America. This man, whose real name is Unthan, was born without hands, being the son of an East Prussian teacher. Chiefly as the result of the iron will of his father, who methodically instructed him, while still a child, in the use of his feet, he has succeeded so well that now, at the age of 60, he plays the violin excellently, blows the trumpet, swims and carries out other very difficult manipulations. He gave trials of his ability and skill to the highest astonishment of the inmates of the hospital. With great dexterity, he drew a cigaret case from his coat, lighted the cigarets with his toes, played cards with his feet, taking them up himself when they had fallen on the ground. To our surprise, he drew the cork from a wine bottle, using a cork-screw with his toes, and himself pushed and put chairs and tables together in order to empty the glass and play cards with a wounded man who accompanied him on the piano. Finally, he wrote on a typewriter with astonishing facility and distributed samples of his writing among the patients.

Marriages

MARTHA GURINE THORWICK, M.D., San Francisco, and Count Niso Giannini of Milan, Italy, in San Francisco, April 5.

WALTER FREDERICK PLASSMAN, M.D., Golden Valley, N. Dak., to Miss Frances Brill of Centralia, Ill., April 8.

FRANK DWIGHT BOODY, M.D., Chandler, Ariz., to Mrs. Luen R. Boody of Algona, Ia., in Hampton, Ia., recently.

OLIVER T. BATCHELLER, M.D., Spokane, Wash., to Mrs. Anna C. McKay of Minneapolis, April 15.

JAMES EARLE ASH, M.D., Boston, to Miss Esther Marguerite H. Brown of Montreal, April 16.

GROVER CLEVELAND EMERY, M.D., to Miss Eleanor F. Reilly, both of New York City, Nov. 25, 1914.

HAROLD T. LOW, M.D., to Miss Estella Josephine Fariello, both of Pueblo, Colo., March 31.

WILSON RUFFIN ABBOTT, M.D., Chicago, to Miss Ruth Webb of La Grange, Ill., April 15.

J. ROWAN MORRISON, M.D., to Miss Lucinda Trabue, both of Louisville, Ky., April 29.

IRA FRANK, M.D., Chicago, to Miss Sylvia Simon of Minneapolis, April 6.

Deaths

Richard Potts Daniel, M.D. University of Pennsylvania, Philadelphia, 1851; a Fellow of the American Medical Association; passed assistant surgeon, U. S. Navy from 1854 to 1859; surgeon of the Eighth Florida Infantry, C. S. A. during the Civil War; first president of the State Board of Health of Florida, holding that office for several years; president of the Florida Medical Association and Duval County Medical Society for many years, and honorary president of both of these organizations at the time of his death; one of the heroes of the yellow fever epidemic of 1888 in Jacksonville, where he remained at his post throughout the epidemic; said to have been the oldest practitioner of Jacksonville; died at his home in that city April 10, aged 86.

George William Marshall, M.D. Jefferson Medical College, 1876; a Fellow of the American Medical Association and American Academy of Medicine; formerly secretary and president of the Delaware State Medical Society, trustee of Delaware College and treasurer of the Board of Trustees of the State College for Colored Students; surgeon to the Milford Emergency Hospital; formerly insurance commissioner of Delaware, state senator and president pro tem. of the Senate; one of the reorganizers of the Delaware State Militia and colonel in the Delaware National Guard; died at his home in Milford, April 18, from influenza, aged 60.

Chester Alfred Mayer, M.D. New York Homeopathic Medical College, New York City, 1881; for several years a member of the Kentucky State Board of Health; a member of the Board of Trustees of the Louisville Free Public Library, and medical advisory board of the Kentucky State Confederate Home, Pewee Valley, professor of theory and practice of medicine in the Southwestern Homeopathic Medical College, Louisville; died in the Russell Sanatorium, Louisville, April 10, from cerebral hemorrhage, aged 57.

Thomas Mort Koon, M.D. Rush Medical College, 1894; formerly a Fellow of the American Medical Association; a member of the Michigan State Medical Society; formerly health officer of Grand Rapids; a member and at the time of his death vice-president of the Michigan State Board of Health; a specialist in diseases of children; who had been ill for a year with nephritis; died in a sanitarium in Minneapolis, April 11, from pneumonia, aged 45.

Horace W. Nicholson, M.D. College of Physicians and Surgeons, Baltimore, 1906; of Baltimore; a member of the Medical and Chirurgical Faculty of Maryland; visiting eye, ear, nose and throat surgeon to the General Marine Hospital, Crisfield, Md.; assistant in the nose and throat department of the University of Maryland and Mercy Hospitals, Baltimore; died at the home of his father in Chestertown, Md., April 14, from angina pectoris, aged 34.

John Parsons, M.D. College of Physicians and Surgeons, Keokuk, Iowa, 1864; Northwestern University Medical School, Chicago, 1868; Bellevue Hospital Medical College, 1875; a Fellow of the American Medical Association; for thirty years connected with the Board of Health of New York City; a veteran of the Civil War, in which he served in the medical department; died at his home in Kingsbridge, New York City, April 17, aged 73.

Thomas J. Bell, M.D. Missouri Medical College, St. Louis, 1877; a member and once first vice-president of the State Medical Association of Texas; local surgeon at Tyler, Tex., for the St. Louis Southwestern and International and Great Northern railways; vice-president of the State Board of Medical Examiners from 1905 to 1907; died at his home in Tyler, January 9, from angina pectoris, aged 66.

Charles E. Farnum, M.D. Hahnemann Medical College; College of the Pacific, San Francisco, 1878; a Fellow of the American Medical Association; of San Francisco; formerly professor of anatomy in Cooper Medical College, San Francisco, and a member of the Board of Examiners of the Medical Society of the State of California; died in St. Mary's Hospital, San Francisco, April 14, aged 60.

James Brainerd Field, M.D. Harvard Medical School, 1884; a Fellow of the American Medical Association; surgeon to the Lowell Hospital and Lowell General Hospital; for twenty years treasurer of the Association of Massachusetts Boards of Health; for nine years chairman of the Lowell Board of Health; died at his home in Lowell, April 15, from pneumonia, aged 56.

Michael A. Hughes, M.D. University of Wooster, Cleveland, Ohio, 1875; oculist and aurist of the Denver and Rio

Grande Western Railroad at Salt Lake City, Utah; chief of staff of the Holy Cross Hospital and formerly president of the Salt Lake County Medical Society; died at his home in Salt Lake City, April 9, from cerebral hemorrhage, aged 64.

Daniel Francis Lee, M.D. Omaha (Neb.) Medical College, 1902; associate professor of materia medica in his Alma Mater; a member of the Nebraska State Medical Association; formerly physician of Douglas County and assistant city physician of Omaha; died in St. Catherine's Hospital in that city, April 13, from heart disease, aged 36.

Max Johannes Walter, M.D. University of Pennsylvania, Philadelphia, 1912; a Fellow of the American Medical Association; a specialist in physiologic therapeutics and medical director of the Pennsylvania Orthopedic Institute and Sanatorium, Philadelphia; died suddenly in that institution, April 17, from cerebral hemorrhage, aged 41.

John Joseph Hector McAllister, M.D. Harvard Medical School, 1903; a Fellow of the American Medical Association; a specialist on diseases of the skin of New Bedford, Mass.; a member of the staff of the Tuberculosis Sanatorium, Sassaquin, Mass.; died at his home in New Bedford, April 16, from disease of the kidney, aged 37.

Victor Hawthorne Smith, M.D. Bellevue Hospital Medical College, 1892; of Portland, Ore.; for a time surgeon on steamers plying between Portland and Japan; died at his home in Portland, April 2, from heart disease, aged 45.

Alexander Pourie McLaren, M.D. Trinity Medical College, Toronto, 1892; a practitioner and druggist of Rainier, Ore.; died in the Good Samaritan Hospital, Portland, Ore., March 29, from hemorrhage of the stomach, aged 46.

Thomas Wesley Mills, M.D. McGill University, Montreal, 1878; formerly professor of physiology in his alma mater, but of late years a resident of London, England; died at his home in England, recently, from angina pectoris.

John D. Dickerson, M.D. Baltimore Medical College, 1892; a Fellow of the American Medical Association; and a well-known practitioner of Stockton, Md.; died in Wilmington, Del., Dec. 25, 1914, from heart disease, aged 57.

John Walter McBeth, M.D. Penn Medical University, Philadelphia, 1879; of Kansas City, Mo.; at one time inspector in the Kansas City Health Department; died in the Kansas City General Hospital, April 1, aged 62.

Robert K. Kneass, M.D. Hahnemann Medical College, Philadelphia, 1873; of Baltimore, Md.; consulting physician to St. Luke's Hospital, Baltimore; died in New Haven, Conn., April 3, from pneumonia, aged 60.

John Joseph Kelley, M.D. University of Pennsylvania, Philadelphia, 1888; a member of the Medical Society of the State of Pennsylvania; died at his home in Archbald, Pa., April 3, from pneumonia, aged 56.

William Ellis Nichols, M.D. Eclectic Medical Institute, Cincinnati, 1906; a member of the Kentucky State Medical Association; died at his home in Fullerton, Ky., April 1, from heart disease, aged 38.

William H. Christopher, M.D. Starling Medical College, Columbus, Ohio, 1879; a member of the Ohio State Medical Association; died at his home in London, Ohio, April 2, from heart disease, aged 59.

W. H. Orr, M.D. Kentucky School of Medicine, Louisville, 1881; editor and publisher of the Corpus Christi (Tex.) *Crony*; died at his home in Corpus Christi, March 3, from acute gastritis, aged 58.

Thomas Jensen, M.D. Eclectic Medical Institute, Cincinnati, 1874; for forty-two years a resident of Houston County, Minn.; died at his home in Spring Grove, Minn., about April 8, aged 74.

Wendell Holmes Adams, M.D. Medical School of Maine, Brunswick, 1881; formerly a member of the Massachusetts Medical Society; died at his home in Kingston, Mass., January 1, aged 61.

Henry Osthues, M.D. Niagara University, Buffalo, N. Y., 1894; afterward professor of anatomy in his alma mater; died at his home in Brooklyn, April 4, from bronchopneumonia, aged 46.

James W. Brown, M.D. Northwestern University Medical School, Chicago, 1877; for twenty-five years a practitioner of Grass Valley, Cal.; died at his home, April 5, from pneumonia.

Charles F. Clark, M.D. Hahnemann Medical College, Chicago, 1881; for many years a practitioner of Woodland, Cal.; died in the Livermore (Cal.) Sanitarium, April 3, aged 57.

Albert Keidel, M.D. University of Goettingen, Germany, 1878; a member of the State Medical Association of Texas; died at his home in Fredericksburg, Tex., Dec. 21, 1914, aged 62.

Justin C. Elliott, M.D. University of Buffalo, N. Y., 1851; formerly of Springville, N. Y., and New Brighton, Pa.; died at the home of his daughter in Ardmore, Pa., April 8, aged 87.

Joseph E. Boylan, M.D. Medical College of Ohio, Cincinnati, 1884; of Roslyn, L. I., N. Y.; died in the Roosevelt Hospital, New York City, April 6, from cerebral hemorrhage.

Henry Kolb, M.D. New York Homeopathic Medical College, New York City, 1882; died at his home in New York City, April 6, from cerebral hemorrhage, aged 54.

J. N. Doyle (license, Tennessee, 1889), for many years a practitioner of Centerville and Bon Aqua, Tenn.; died in the latter place, April 7, from influenza, aged 80.

Loda W. D. Jerman, M.D. Medical College of Ohio, Cincinnati, 1879; of New Point, Ind.; died in the Deaconess Hospital, Indianapolis, January 3, aged 77.

Albert C. Brown, M.D. University of Pennsylvania, Philadelphia, 1870; for forty years a practitioner of Osage City, Kan.; died at his home, April 4, aged 81.

William Joseph Dougherty, M.D. Baltimore Medical College, 1907; of Beverly Farms, Mass.; died at the home of his mother in that place, April 6, aged 33.

Berryman S. Rice, M.D. Medical College of Ohio, Cincinnati, 1872; a Confederate veteran; died at his home in Catlettsburg, Ky., January 6, aged 76.

Henry E. Lubbinga, M.D. Rush Medical College, 1896; also a druggist; died in his drug store in Chicago, April 5, from influenza, aged about 48.

George G. Nunn, M.D. Hospital College of Medicine, Louisville, Ky., 1891; died at his home in Joplin, Mo., April 2, from pneumonia, aged 53.

J. H. Turner, M.D. University of Maryland, Baltimore, 1840; died at his home in Martinsville, Va., April 1, from senile debility, aged 89.

Daniel H. Foster (license, New York), a practitioner for more than forty years; died at his home in Scottsburg, N. Y., January 31, aged 79.

Josiah Brower, M.D. Eclectic Medical Institute, Cincinnati, 1878; a veteran of the Civil War; died at his home in Gilead, Ind., April 6.

Orin Stevens, M.D. Medical School of Maine, Brunswick, 1869; also a druggist; died at his home in Oxford, February 5, aged 89.

Charles Fessenden Nichols, M.D. Harvard Medical School, 1870; died at his home in West Roxbury, Boston, April 5, aged 69.

William H. Siple, M.D. College of Physicians and Surgeons, Baltimore, 1890; died at his home in Petersburg, W. Va., April 4.

Edgar L. Hawley, M.D. Louisville (Ky.) Medical College, 1881; died at his home in Hapeville, Atlanta, Ga., March 26, aged 50.

James Belt Chesley, M.D. University of Maryland, Baltimore, 1868; died at his home in Forest Glen, Md., April 7, aged 71.

John H. Duncan, M.D. Eclectic Medical Institute, Cincinnati, 1878; died at his home in Harrison, Ohio, April 4, aged 70.

Harvey Collins Summers, M.D. Medical College of Ohio, Cincinnati, 1878; died at his home in Amo, Ind., January 11, aged 65.

Hattie C. Brown, M.D. Woman's Medical College of Cincinnati, 1892; of Cincinnati; died at her home, April 4, aged 51.

James Might, M.D. New York University, New York City, 1851; died at his home in Port Hope, Ont., January 26, aged 84.

Herman T. J. Howe, M.D. University of Vermont, Burlington, 1877; died at his home in Waitsfield, Vt., January 22, aged 64.

D. C. Dickey (license, Tennessee, 1889), of Chaseville Tenn.; died in Jackson, Tenn., February 11, from nephritis, aged 88.

William H. Bunn, M.D. University of Pennsylvania, Philadelphia, 1861; died at his home in Philadelphia, April 1.

The Propaganda for Reform

IN THIS DEPARTMENT APPEAR REPORTS OF THE COUNCIL ON PHARMACY AND CHEMISTRY AND OF THE ASSOCIATION LABORATORY, TOGETHER WITH OTHER MATTER TENDING TO AID INTELLIGENT PRESCRIBING AND TO OPPOSE MEDICAL FRAUD ON THE PUBLIC AND ON THE PROFESSION

SECRETOGEN

Report of the Council on Pharmacy and Chemistry

The Council has authorized publication of the following report dealing with two internal secretion specialties—Secretogen Elixir and Secretogen Tablets—to call attention to the unfounded and extravagant claims made for this class of products.

W. A. PUCKNER, Secretary.

Test tube experiments show that pepsin hydrolyzes proteins in acid solutions; that pancreatin digests protein in alkaline liquids, and that diastase converts starch into sugar Based on these facts, it was assumed that these ferments would aid digestion. This assumption was correct if limited to certain cases of dyspepsia in which it can be shown that certain ferments are absent or deficient. But this limitation was not realized or remembered; on the contrary, the indiscriminate use in all kinds of cases of indigestion became widespread and still continues, although to a less extent. Herein lies the great disappointment that has followed the use of digestive ferments.

More recently hormones were discovered, and while their importance has not been fully worked out, it has been assumed that they are responsible for the secretion of digestive ferments, and that in their absence this secretion fails. Without waiting for proof of this assumption, that is, that digestive failure is due to lack of hormones, proprietary medicine promoters are already placing on the market various secretion specialties.

As an example of this new class of specialties and of the unfounded claims made for them, your referee presents the following report on Secretogen Elixir and Secretogen Tablets offered to physicians by the G. W. Carnrick Company.

Secretogen Elixir is said to contain pancreatic secretin obtained from the duodenum with 1/10 of 1 per cent. of hydrochloric acid. Secretogen Tablets are said to be prepared from pure secretin and succus entericus obtained from the epithelial cells of the duodenum. The claims for Secretogen are based on the physiologic action of secretin as described by various observers. To determine whether these claims are justified it becomes necessary to review the evidence advanced to prove that secretin stimulates the digestive glands.

Secretin is a hormone, a chemical substance produced by the action of hydrochloric acid on a previously formed substance, "prosecretin," contained in the cells of the intestinal mucous membrane, especially of the duodenum. Secretin is absorbed by the blood and carried to the pancreas, liver and intestinal mucosa, which are thereby stimulated to produce their characteristic secretions, namely, bile, pancreatic juice and succus entericus. When secretin is injected into the blood, it causes an increase in the flow of these secretions. Some observers have claimed that secretin is absent in cases of diabetes in which the pancreas is still found normal. Wentworth[1] reported several cases of marasmus in which he found no evidence of prosecretin. This deficiency, he believes, is the cause of this disease.

The Carnrick Company, adopting the foregoing views, namely, that secretin is necessary to secure the normal action of pancreas, liver and intestine, as proved, placed on the market their specialty "Secretogen," to take the place of the missing secretin.

1. Wentworth, A. H.: The Cause of Infantile Atrophy, Deduced from a Study of Secretin in Normal and Atrophic Infants, THE JOURNAL A. M. A., July 20, 1907, p. 204.

The foregoing conclusion cannot, however, be sustained. There are numerous cases in which no hydrochloric acid is produced in the stomach and hence—as it is produced by the action of hydrochloric acid—no secretin can be produced in the intestine. Yet in these cases the pancreatic juice and bile are secreted in normal amounts and digestion goes on normally after the food leaves the stomach. In such cases the pancreas and liver must be stimulated to secretion by some other mechanism than secretin.

The proof that the absence of secretin is characteristic of diabetes or of marasmus is not yet available. Sweet and Pemberton[2] found that many circumstances interfered with the extraction of secretin, so that the mere failure to obtain it in a given case is not proof of its absence, unless the various inhibiting influences are given due consideration. The conclusions reached by these authors are that "the evidence so far adduced that secretin is absent in some varieties (of diabetes) does not seem conclusive," and that "the specific absence or deficiency of secretin in marasmus seems to remain as yet unproven."

The favorable reports of Moore[3] in regard to the use of secretin in diabetes are not confirmed by the experience of Foster[4] in five cases, or by the case reported by Dakin and Ransom.[5]

In regard to the use of secretin in intestinal disorders, the G. W. Carnrick Company refers to an article by J. W. Beveridge.[6] An examination of this article shows it to be unscientific and uncritical. The author presents four cases to "demonstrate the peculiar potency exercised by secretin." Of the first he says:

"Stomach was dilated, food delay, seventy-two hours; hyperacidity, vomiting daily, five to twelve times, urine high specific gravity, over 3 per cent. urea, trace albumen."

The patient improved somewhat after gastro-enterostomy with removal of the gallbladder; the vomiting ceased, but the stools continued clay-colored and the high urea output still kept up. Secretin was given, and after this the report continues:

"The stools became normal in color at the end of the second month, weight gradually increased until 122¾ pounds was reached and the urea is now normal, averaging about 1 per cent."

This case is offered to prove the absence of secretin and its effect when given by the mouth. As evidence of hepatic insufficiency the author apparently relies on the color of the stools, and for pancreatic insufficiency he cites the high urea output. He claims that when the pancreas does not furnish an efficient secretion, the proteins of the food fail to be converted into amino-acids, and instead, raise the percentage of urea. Consequently, he concludes that a high percentage of urea indicates the absence of secretin. It is usually held that a high percentage of urea depends on two factors, ingestion of a large amount of protein and concentration of the urine. The author gives no data as to the amount of albuminous food, the amount of urine, or whether the percentage of urea was learned by examining a single specimen or the total quantity for twenty-four hours. The mildest judgment that can be passed on such clinical data is that they are totally inadequate. Without doubt the percentage of urea could have been reduced to "normal" by causing the patient to drink water freely. The remaining cases show similar hasty conclusions from insufficient data, rendering them worthless as evidence.

The G. W. Carnrick Company introduces a number of testimonials as to the value of Secretogen. These testimonials are similar to all testimonials. They include no evidence of careful diagnosis, and present an uncritical estimate of the results. They show that the writers have given Secretogen Elixir or Tablets indiscriminately in almost the

2. Sweet, J. E., and Pemberton, R.: Experimental Observations on Secretin, Arch. Int. Med., February, 1908, p. 231.
3. Moore, Edie and Abram: Biochem. Jour., 1906, i, 28; ibid., i, 446.
4. Foster, N. B.: Cases of Diabetes Treated with Secretin, Jour. Biol. Chem., January, 1907.
5. Dakin, H. D., and Ransom, C. C.: Treatment of Case of Diabetes with Secretin, Jour. Biol. Chem., January, 1907.
6. Beveridge, J. Wallace: Secretin, Am. Jour. Gastro-Enterology, April, 1914, p. 170.

whole range of digestive disorders, in nephritis, neuralgia, liver disease and gallstones, exophthalmic goiter, neurasthenia, epilepsy, etc. As dependable evidence, these testimonials are not worthy of consideration.

A rational basis for the therapeutic value of Secretogen is lacking for the following reasons:

1. No evidence has been presented that the absence of secretin is a cause of gastro-intestinal diseases. It is usually present, and if not present, as in achylia gastrica, there is evidently some compensating arrangement by which the pancreas is stimulated to perform its regular functions.

2. There is no evidence that secretin in any form is physiologically active when administered by the mouth.

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Charles, J. R.: Treatment of Diabetes with Secretin, Bristol Med.-Chir. Jour., September, 1906; Med. Press and Circular, Nov. 21, 1906.
Meltzer, S. J.: Animal Experimentation in Relation to our Knowledge of Secretions, Especially in Internal Secretions, THE JOURNAL A. M. A., May 7, 1910, p. 1506.
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Enriquez: La Sécrétine Médication acide duodénale Stimulation de function sécrétin iques chez l'homme, Rev. de thérap. méd.-chir., Paris, 1904, lxxi, 187.

Correspondence

Hexamethylenamin as Disinfectant for the Urinary Apparatus

To the Editor:—My contention in regard to the action of hexamethylenamin in the urine has been either misunderstood or misquoted in an abstract (THE JOURNAL, March 27, 1915, p. 1118) of an article by Dr. H. F. Høst. Inasmuch as Dr. Høst's work is essentially in agreement with my own conclusions, this misstatement should be corrected. To quote the review, Høst "states in conclusion that his research has demonstrated that F. Hinman was wrong when he said (THE JOURNAL, Nov. 1, 1913, p. 1601) that neutral or feebly alkaline urines are unable to split off formaldehyd. He adds that Hinman's mistake was that he did not heed the temperature in testing for formaldehyd, as this is a reversible reaction and should be carried out at 37 C." In my study I found formaldehyd in some amount in every urine tested, irrespective of alkalinity or acidity, but only 36 per cent. of the urines had formaldehyd in a strength of 1:30,000 or better, and over 90 per cent. of these had a urinary acidity of 2 c.c. or more of tenth-normal sodium hydroxid to 10 c.c. of urine and none of these urines were neutral or alkaline. Therefore, I concluded that neutral or alkaline urines are unable to split off formaldehyd in antiseptic amounts. However, I did not state that "neutral or feebly alkaline urines are unable to split off formaldehyd" in any amount, as is the inference of Høst. As stated, I found some formaldehyd in every urine, and, as shown in a paper read as early as May, 1913, before the American Urological Association in Washington, and published in the *Transactions* of that meeting, the great instability of the reaction was recognized. I stated that "formaldehyd, CH_2O, is a colorless gas, an oxidation product of methyl alcohol, CH_3OH. It is readily soluble in water, and liquor formaldehydi is the name given to a solution of the gas. It readily combines with many inorganic and organic substances. When treated with an excess of ammonia it will combine to form hexamethylenamin, according to the equation: 6 CH_2O plus 4 NH_3 equals $(CH_2)_6N_4$ plus 6 H_2O. Contrariwise, if hexamethylenamin is treated with an acid it is reconverted into liquor formaldehydi. These changes, however, are, as a rule, of gradual occurrence, and depend largely on the degree of acidity, or of alkalinity, of heat, etc., and on the percentage concentration. A strong solution of hexamethylenamin, neutral in reaction, will break down to some extent even at room temperature, as shown by examining the stock solutions of hexamethylenamin in the wards of the hospital, some of which, that had stood several weeks, showing a liquor formaldehydi content of about 1:8,000. Liquor formaldehydi and hexamethylenamin, therefore, are very unstable chemical compounds, and particularly so toward acids and alkalies."

FRANK HINMAN, M.D., San Francisco.

Ancylostoma, not Ankylostoma

To the Editor:—I have been interested in the correspondence in THE JOURNAL, April 18, as well as in the Current Comment, March 27, that called it forth. The reason for the spelling "ancylostoma" instead of "ankylostoma" is obvious to those who have a knowledge of Greek and Latin. All scientific names of animals are Latin words or in as near Latin form as the inventor of the names can make them. As Dr. Huffman says, if the inventor of the name makes an obvious typographic error or a wrong Latin transcription from Greek roots, according to Article 19 of the International Code of Zoological Nomenclature, the name should be correctly written or transcribed. Ancylostoma is derived from the Greek words ἀγκύλος, στόμα. The Latin transcription of ἀγκύλο- is obviously ancylo-. As Dr. Stiles has bestowed on the hookworm commonly found in the United States, the simple, euphonious and expressive term "necator," the new and correct spelling of the Old World hookworm will not give American physicians much concern.

A good many persons probably objected to the change of Acidum Carbolicum to Phenol, but I presume most physicians are accepting the official form of the word now. In a short time doubtless all will be accepting the internationally official spelling of the Old World hookworm, ancylostoma.

Those who prefer ankylostoma ought in strict consistency to spell leukocyte leukokyte from the Greek λευκός, κύτος, and cytolysis, kytolysis, and so on, for every word with the commonly used root cyto. Those who find no difficulty in saying micrococki for micrococci can easily give the pronunciation of k to the letter c in ancylostoma, while others who use the pronunciation micrococsi will pronounce ancylostoma with the c of the word soft, as Dr. Hirshberg suggests.

C and k in English words, particularly in technical words, are extremely awkward letters. It is unfortunate that we have no system of slipping in an h as the Italians do when c is hard before e, i, and y, and as is actually, but incorrectly, done in writing anchylosis for ankylosis or ancylosis. A still better plan would be to eliminate c entirely and use s when it is soft and k when hard, as is done by the English Simplified Spelling Society.

A strict Latinized form of certain common words would make many interesting changes and many words scarcely recognizable, such as leucaemia (which is sometimes seen) for the usual leukaemia. Kinetic energy and kinesthetic sense would become cinetic energy and cinesthetic sense, forms which I have never seen. Cinematograph, however, is probably familiar to all.

A large part of the differences in spelling of words containing c and k perhaps depends on the classical training of the person who first invented the terms and on the language which first placed the word in science, k being conspicuous in German words and c in French.

M. W. LYON, JR., M.D., PH.D., Washington, D. C.

Uniformity in Labels of Tubes Containing Hypodermic Tablets

To the Editor:—Some makers of hypodermic tablets label the tubes to read toward the cork, and some toward the bottom of the tubes. This causes annoyance and delay in selecting tablets; often one is in a big hurry to give a hypodermic. Why not ask the manufacturers to label all one way, preferably toward the cork, for that puts the tube into the left hand and the cork into the right?

A. W. BAIRD, M.D., New York.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

POISONOUS PROPERTIES OF CARBON TETRACHLORID

In reply to an inquiry concerning the properties of carbon tetrachlorid, we stated in this department (April 10, 1915, p. 1267) that "we find no description of its toxic action, but it is probable that its action in this respect would be similar to that of chloroform."

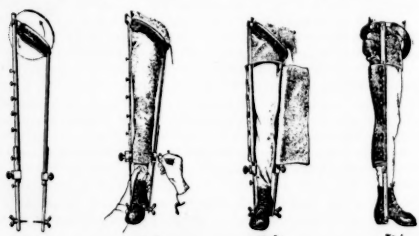
Our attention has been called to two recorded cases of poisoning from the use of this substance in shampoos. Colman in the *Lancet*, June 22, 1907, p. 1709, warned against the use of carbon tetrachlorid in hair dressing as it had come into use as a "dry" shampoo in some English cities. Colman believes that its action resembles that of chloroform, the differences being explicable to a large extent by differences in physical characters (vapor pressure, solubility in water, etc.). It is important to note that all observers have found carbon tetrachlorid to be more toxic than chloroform. It is more irritant to mucous membranes, and is much more depressant to the circulatory and respiratory systems. During its inhalation, cardiac weakness, headache and mental and bodily exhaustion have been noted. Anesthesia is less easily produced and is slower in appearing than that by chloroform, owing to the lower vapor pressure of carbon tetrachlorid (boiling point of chloroform from 60 to 62 C., of carbon tetrachlorid 76.5 C.), but it also disappears less quickly. The second case was noted in THE JOURNAL, July 31, 1909, p. 392.

THE ENGELMANN SPLINT

To the Editor:—Please tell me where I can obtain the Engelmann splint, mentioned in an abstract in THE JOURNAL, April 3, 1915, p. 1201.

C. S. H.

ANSWER.—The Engelmann splint consists of two strips of metal connected with a ring at the top which fits over the thigh as high as it can be pushed up against the crotch. It is fastened at the lower end with a spike on each side which



The Engelmann splint.

is driven into the shoe between the sole and the upper, close to the heel. A slide and thumb screw on each strip adjust it to the proper length. The trouser leg is slit and cut across above and below the lesion so it can be turned back and buttoned across the back. Dr. Engelmann's address in 1914 was Rathausstrasse 7, Vienna.

LANDAU COLOR TEST FOR SYPHILIS

To the Editor:—Kindly give me the reference to the second article of Landau on his color test for syphilis. In the references thereto in the Department of Queries and Minor Notes of April 3, 1915, p. 1182, and elsewhere, no reference to the second article is given.

A. W. STILLIANS, M.D., Chicago.

ANSWER.—His latest (unpublished) work was described in the *Presse Médicale*, May 2, 1914, p. 335. The most recent article on this subject is by Kolmer, this issue, p. 1461.

Medical Education and State Boards of Registration

COMING EXAMINATIONS

ARKANSAS: Regular, Little Rock, May 11-12. Sec., Dr. W. S. Stewart, Citizens Bank Bldg., Pine Bluff. Homeopathic: Little Rock, May 11. Sec., Dr. Scott C. Runnels, 900 Scott St., Little Rock. Eclectic: Little Rock, May 13. Sec., Dr. C. E. Laws, 712 Garrison Ave., Fort Smith.

GEORGIA: Atlanta and Augusta, June 2-4. Sec., Dr. C. T. Nolan, Marietta.

ILLINOIS: Chicago, May 13-15. Sec., Dr. C. St. Clair Drake, Springfield, Ill.

IOWA: Iowa City, June 10-12. Sec., Dr. G. H. Sumner, Capitol Bldg., Des Moines.

KANSAS: Kansas City, June 8-10. Sec., Dr. H. A. Dykes, Lebanon.

KENTUCKY: Louisville, June 8-10. Sec., Dr. A. T. McCormack, Bowling Green.

LOUISIANA: New Orleans, June 3-5. Sec., Dr. E. L. Leckert, 716 Machea Bldg., New Orleans.

MASSACHUSETTS: Boston, May 11-13. Sec., Dr. Walter P. Bowers, Room 501, No. 1 Beacon St., Boston.

MICHIGAN: Detroit, May 27-29. Sec., Dr. B. D. Harison, 504 Washington Arcade, Detroit.

MINNESOTA: Minneapolis, June 1-4. Sec., Dr. Thomas McDavitt, Lowry Bldg., St. Paul.

NEBRASKA: Lincoln, June 10-11. Sec., Dr. H. B. Cummins, Seward.

NEVADA: Carson City, May 3. Sec., Dr. S. L. Lee, Carson City.

NEW YORK: Albany, Buffalo, New York and Syracuse, May 25-28. Mr. Harlan H. Horner, Chief, Examination Division, State Education Bldg., Albany.

NORTH CAROLINA: Greensboro, June 8. Sec., Dr. H. A. Royster, Raleigh.

OHIO: Columbus, June 8-11. Sec., Dr. George H. Matson, Columbus.

PENNSYLVANIA: Philadelphia and Pittsburgh, June 1-3. Sec., Dr. Nathan C. Schaeffer, Harrisburg.

SOUTH CAROLINA: Columbia, June 8. Sec., Dr. A. Earle Boozer, 1806 Hampton St., Columbia.

TENNESSEE: Knoxville, Memphis and Nashville, May 3. Sec., Dr. A. B. DeLoach, 426 Scimitar Bldg., Memphis.

Alabama January Report

Dr. W. H. Sanders, secretary of the State Board of Medical Examiners of Alabama, reports the written examination held at Montgomery, Jan. 5-8, 1915. The total number of subjects examined in was 10; total number of questions asked, 100; percentage required to pass, 75. The total number of candidates examined was 35, of whom 15 passed and 20 failed. The following colleges were represented:

College	Year Grad.	Per Cent.
PASSED		
Birmingham Medical College	(1913) 78; (1914) 75.4, 76.5, 78.4, 81	
Atlanta Medical College	(1914)	75
Tulane University of Louisiana	(1914)	80
Columbia University, College of Phys. and Surgs.	(1914)	80
Columbus Medical College	(1883)	81
Western Reserve University	(1913)	76.1
University of Pennsylvania	(1914)	86
Memphis Hospital Medical College	(1903)	84
University of Tennessee	(1914)	75, 76.4
Vanderbilt University	(1914)	82.3
FAILED		
Birmingham Medical College	(1913) 68.6, 71.1; (1914) 60.2, 63.6, 67.1, 67.6, 69.7, 70.3, 71	
Atlanta Medical College	(1914)	71
Southern Medical College	(1885)	39.2
Chicago College of Med. and Surg.	(1914)	73
Hahnemann Medical Coll. and Hosp., Chicago	(1899)	63.3
Mississippi Medical College	(1912) 51.3; (1910)*	66.1
Memphis Hospital Medical College	(1912) 71; (1913)	46
Universities of Nashville and Tennessee	(1911)	70.4
Vanderbilt University	(1914)	63

*No grade given.

Connecticut Homeopathic March Report

Dr. E. C. M. Hall, secretary of the Connecticut Homeopathic Medical Examining Board, reports the written examination held at New Haven, March 9, 1915. The total number of subjects examined in was 7; total number of questions asked, 70; percentage required to pass, 75. One candidate, a graduate of the New York Homeopathic Medical College and Flower Hospital, 1913, was examined and passed with a grade of 85. One candidate, a graduate of the New York Homeopathic Medical College and Flower Hospital, 1913, was licensed through reciprocity with New York.

Book Notices

DISEASES OF THE BRONCHI, LUNGS AND PLEURA. By Frederick T. Lord, M.D., Visiting Physician, Massachusetts General Hospital. Cloth. Price $5 net. Pp. 605, with 96 illustrations. Philadelphia: Lea and Febiger, 1915.

In the preface the author states that "the aim has been to present current knowledge, founded on the literature and the experience gained in the wards and pathologic laboratory of the Massachusetts General Hospital, in such form as to be of value to students and practitioners and also to provide a basis for further research. References are given to the most important original articles in order that the literature may be readily available to those who wish to go more fully into particular problems. Pulmonary tuberculosis is not considered under a separate heading, but special attention is given to conditions which simulate pulmonary tuberculosis and their differential diagnosis." Dr. Lord has followed this aim with fidelity and has been successful in presenting the present-day knowledge on the subject. He has covered practically every disease of the main respiratory organs excepting pulmonary tuberculosis, and it was probably not unwise to omit it from special consideration. Both the practitioner and the student will find this an excellent work in which the views of authorities on etiology, pathology and prognosis are clearly stated, and the conventional methods of diagnosis and treatment are sufficiently amplified. The book is well printed and well illustrated, including microscopic and Roentgen-ray findings. The style is clear and concise.

NEUROLOGISCHE SCHEMATA FÜR DIE ÄRZTLICHE PRAXIS. Textband und Formulare in Mappe. Von Edward Flatau. Cloth. Price, 4.80 marks. Berlin: Julius Springer, 1915.

The author has arranged the various neurologic schemata used in neurologic practice in a manner convenient for practical application. The main brochure contains the text and tables indicating nervous innervation of skin, mucous membranes and muscles, as well as their functions. In addition, brief mention is made of the various paralyses resulting from disturbed innervation of muscles. Accompanying pamphlets contain schemata for electrical motor points and distribution of peripheral nerves, and printed blanks for the sensory segmental distribution of the spinal cord. The frequent reference to these schemata and the correct filling in of neurologic findings should result in more exact neurologic diagnoses, as it will make unnecessary the mere trusting to memory in the matter of localizing certain nerve lesions.

THERAPEUTICS OF THE CIRCULATION. By Sir Lauder Brunton, Bt., M.D., D.Sc., Consulting Physician to St. Bartholomew's Hospital. Second edition. Cloth. Price, $2.50 net. Pp. 536, with illustrations. New York: Paul B. Hoeber, 1914.

This edition of Brunton's monograph is much more carefully edited than the first, and can be commended accordingly. It covers much more ground than the title intimates. For example, the first 152 pages are devoted to a review of the physiology of the circulatory system. A chapter is also devoted to sphymography and cardiography, electrocardiography and other methods of examination. The next three chapters describe the pathology of the organs of circulation. The last 200 pages approximately are devoted to treatment, which is considered fully.

DISEASES OF THE SKIN. By James H. Sequeira, M.D., Lond., F.R.C.P., F.R.C.S., Physician to Skin Department at the London Hospital. Second Edition. Cloth. Price, $8.00. Pp. 650, with 286 illustrations. Philadelphia: P. Blakiston's Son & Co., 1915.

Sequeira's book is written in simple outline form. It contains 238 black and white illustrations and about fifty fine colored plates. Many of the illustrations are of histologic and pathologic character, showing the microscopic changes in the skin layers. Treatment is not considered except in three appendixes devoted, respectively, to mineral waters, and internal and external treatment. The book is a valuable guide to the practitioner in diagnosing diseases of the skin.

Medicolegal

Duty of Employers as to Furnishing Emergency Treatment

(Hunicke vs. Meramec Quarry Co. (Mo.), 172 S. W. R. 43)

The Supreme Court of Missouri, Division No. 1, affirms an order granting the plaintiff a new trial after a judgment had been rendered for the defendant, which had been sued for damages alleged to have been caused by its negligence in failing to procure promptly a physician or surgeon to attend a severely injured employee. The court says that the jury was instructed that if, after the employee was injured, the defendant exercised ordinary care to secure for him medical and surgical aid, then the defendant had fully discharged its duty to him, and there could be no recovery in this case. This instruction assumed that the defendant owed to the employee the duty to furnish him emergency treatment. That was a correct statement of the law. But another instruction told the jury that if they were unable to determine whether the employee would have died from the injury received, even though proper medical assistance had been promptly furnished him, then they should find for the defendant. The effect of this instruction was to tell the jury that the defendant owed the plaintiff no duty whatever, unless the jury could determine an impossibility, namely, that the employee would not have died had proper medical attention been given him. God alone knew that fact, and no man or jury could determine that which no one knows, and which the evidence could not possibly reveal.

The law is that, just as soon as an injury of this character occurs, it then becomes the duty of the master to furnish medical treatment, and if he neglects to use reasonable efforts to do so, and the evidence shows that in all reasonable probability that failure was the proximate cause of the death, then the defendant is liable. In other words, in such a case, the court should have instructed the jury for the plaintiff that if they believed from the evidence that the negligence of the defendant in not furnishing medical treatment for the injured party was the direct and proximate cause of his death, notwithstanding the injury, then they should find for the plaintiff; but, on the other hand, the court should have instructed the jury for the defendant that, if they believed from the evidence that the injury the employee sustained was the direct or proximate cause of his death, then they should find for the defendant. Such an instruction would have eliminated from the case all metaphysical speculations, and have submitted to the jury which of the two acts mentioned caused the death.

In the opinion of this court there is no possibility of doubt that the law is that whenever one person employs another to perform dangerous work, and that, while performing that work, he is so badly injured as to incapacitate him from caring for himself, then the duty of providing medical treatment for him is devolved on the employer. This duty grows out of the fact that, when we get down to the real facts in all such cases, there is an unexpressed humane and natural understanding existing between them to the effect that, whenever any one is so injured that he cannot care for himself, then the employer will furnish him medical or surgical treatment, as the case may be. This is common knowledge. There is not an industrial institution in this country, great or small, where that practice is not being carried on today; and that has been the custom and usage among men from the dawn of civilization down to the present day, and will continue to be practiced in the future, just so long as the human heart beats in sympathy for the unfortunate and desires to aid suffering humanity. The same principle underlies all other avocations of life. Even armies, while engaged in actual warfare, observe and obey this rule when possible.

Food and Efficiency.—Good food is always trump in the game of life. Wherever you play it you strengthen your hand.—*Jour. Sociologic Med.*, April, 1915.

Society Proceedings

COMING MEETINGS

AMERICAN MEDICAL ASSOCIATION, San Francisco, June 21-25.

Am. Assn. Gen.-Urin. Surgs., White Sulphur Springs, W. Va., May 18-20.
American Association of Immunologists, Washington, May 10.
American Dermatological Association, New York, May 13-15.
American Gastro-Enterological Association, Baltimore, May 10-11.
Amer. Gynecological Society, White Sulphur Springs, W. Va., May 18-20.
American Laryngological Association, Niagara Falls, June 1-3.
American Medico-Psychological Assn., Fortress Monroe, Va., May 11-14.
American Neurological Association, New York City, May 6-8.
American Orthopedic Association, Detroit, May 6-8.
American Otological Society, Niagara Falls, June 3-4.
American Pediatric Society, Lakewood, N. J., May, 25-27.
American Psychopathological Association, New York, May 5.
American Surgical Association, Rochester, Minn., June 9-11.
Arkansas Medical Society, Little Rock, May 3-6.
Association of American Physicians, Washington, May 11-12.
Conf. of State and Prov. Boards of North America, Washington, May 14.
Connecticut State Medical Society, Hartford, May 19-20.
Florida Medical Association, De Land, May 12-14.
Illinois State Medical Society, Springfield, May 19-20.
Iowa State Medical Society, Waterloo, May 12-14.
Kansas Medical Society, Kansas City, May 5-6.
Maine Medical Association, Poland Springs, June 9-10.
Massachusetts Medical Society, Boston, June 8-9.
Mississippi State Med. Association, Hattiesburg, May 11.
Missouri State Medical Association, St. Joseph, May 10-12.
Nat'l Assn. for the Study of Epilepsy, Old Point Comfort, Va., May 10.
Nebraska State Medical Association, Hastings, May 18-20.
New Hampshire Medical Society, Concord, May 19.
North Dakota State Medical Association, Bismarck, May 12-13.
Ohio State Medical Association, Cincinnati, May 4-6.
Oklahoma State Medical Association, Bartlesville, May 11-13.
Rhode Island Medical Society, Providence, June 3.
Texas State Medical Association, Ft. Worth, May 4-6.
West Virginia State Medical Association, Huntington, May 12-14.

TENNESSEE STATE MEDICAL ASSOCIATION

Eighty-Second Annual Meeting, held at Nashville, April 13-15, 1915

The President, DR. S. M. MILLER, Knoxville, in the Chair

How Shall We Treat Appendicitis?

DR. M. C. MCGANNON, Nashville: When a diagnosis of appendicitis has been made, our efforts at treatment should be: (1) To relieve pain; (2) to keep the stomach empty of food; (3) to prevent the administration of purgatives; (4) to empty the colon by a not too large or forcibly administered enema; (5) to operate on the inflamed viscus as soon as possible after the diagnosis has been made.

DISCUSSION

DR. E. H. BAIRD, Dyersburg: When a patient has local pain, nausea and vomiting, rigidity and elevation of temperature, with a high leukocytosis, it is time to operate on him. If there is a beginning peritonitis, the old Clark treatment of opium can be used. The use of enemas in appendicitis is dangerous.

DR. L. E. BURCH, Nashville: Appendicitis is no longer a medical disease. The statistics related by Dr. McGannon are very illuminating. All patients operated on in the first twenty-four or forty-eight hours recovered. When he operated on the fourth, fifth and sixth day, the results were not so favorable. The time to operate is during the first twenty-four or forty-eight hours. Do not carry the case to the interval. No man knows from the symptoms of appendicitis what is going to happen in a given case. In regard to the diagnosis of the disease, usually the symptoms are cleancut and well defined. In some few cases the symptoms are quite obscure, and it is most difficult to make a diagnosis. In all intra-abdominal conditions, the first symptom is pain and then reflex vomiting. When the vomiting comes first and pain afterward, we can, as a rule, eliminate appendicitis, gallbladder or kidney conditions. In those conditions the patient has pain first, and then afterward the reflex nausea and vomiting.

DR. F. B. REAGOR, Shelbyville: As a general practitioner I want to emphasize the point that appendicitis is not a medical disease, and the general practitioner makes a mistake in attempting to cure a case of appendicitis by medicinal means. One attack of appendicitis is very likely to lead to another. I believe the time to operate is as soon as the diagnosis is made.

DR. K. S. HOWLETT, Franklin: We should not give morphin until after the diagnosis of appendicitis is made. I recall one case in which a patient received my diagnosis with doubt. He asked if I was not going to give him something to relieve the pain. I refused to do so; had I done so that man would not have been operated on that night, or as long as the effect of the morphin had lasted. The fact that I refused to give morphin to relieve him made him willing to be operated on that night. I believe the refusal to give morphin saved his life.

DR. C. N. COWDEN, Nashville: The late Dr. Joseph Price uttered the dictum that appendicitis meant operation immediately after the diagnosis is made. The moment we see a case of appendicitis we are ready for early operation, and a large majority of the laity has been educated to this.

DR. WILLIAM O. SULLIVAN, Newbern: I have not seen any ill results from the transportation of any patient in any stage of the disease. We can give some morphin to allay pain during transit. If a patient has pain in the abdomen, we should not be afraid to send for a surgeon whether we really know definitely what is the matter with him or not.

Tuberculous Meningitis

DR. K. S. HOWLETT, Franklin: The noticeable features of my case were: (1) the sudden onset without prodromas in an adult in good health previously; (2) the absence of any demonstrable tuberculous lesion in any part of the system or of any previous indications of tuberculosis; (3) the subsidence and almost complete disappearance of the meningeal symptoms after the first four or five days, and the continued suppression and abeyance of the symptoms for a week or ten days; (4) the sudden reappearance of these symptoms with indications of exudation and pressure and the rapid decline and death which supervened.

DISCUSSION

DR. HAZLE PADGET, Nashville: There is a well-fixed opinion, based on the pathology of the disease, that tuberculous meningitis is always fatal; that whenever we see such a patient we feel that our hands are tied and that the end is going to be a fatal one. In every suspected case of meningitis the cerebrospinal fluid should be examined, and if in doubt as to the nature of it, serum should be used.

DR. WILLIAM KRAUSS, Memphis: I do not know how many cases of tuberculosis I have had to pass on that were treated for malaria. It is remarkable how many cases of disseminated tuberculosis will give typical third day chills. An important practical point is the determination of the absence of malaria parasites in the blood.

DR. WILLIAM LITTERER, Nashville: In the case Dr. Howlett reported, I took special pains to run over the various tests, using globulin and making a cell count, also resorting to Lange's test, and everything was negative except that there was an increase in the lymphocytes. We felt sure before the inoculation of guinea-pigs that the case was one of tuberculous meningitis from the increase in the lymphocyte count, and from the clinical symptoms, and later on we were able to prove that it was such.

Technic and Results in Eight Gasserian Ganglion Operations

DR. E. J. JOHNSON, Memphis: My eight patients have recovered health and are free from tic douloureux. I operated on the first patient nearly nine years ago. The first four cases were exceedingly difficult and the operations bloody, owing to the fact that at that time I had not learned the importance of tying the common carotid artery on the side on which the operation was to be done. My last four cases have been as bloodless as could be desired, because I now tie the common carotid, and in none of these cases have I seen any ill effect from this preliminary procedure. Five cases reached my hands in a very desperate physical and mental condition. Two patients had more than once attempted self-destruction, seeking relief from the intol-

V. 191

erable agony which they were enduring in spite of large doses of opium.

DISCUSSION

DR. R. E. FORT, Nashville: The silver screw was used first by Muscovitz. Its use in a reasonable number of cases in my hands has been successful. I have employed alcohol injections repeatedly. A good deal depends on the accuracy with which the injections are made. They give relief for from two to six months. I recall one case in which a permanent cure, so far as I know, was effected by two injections. Eighteen months after the last injection, the woman was well. In another case in which only three injections were given, the patient has remained well for over two years. The gasserian ganglion operation is not a simple surgical procedure. It is one of the gravest operative procedures, and we should exhaust every other means before we resort to it.

Bad Results of Colles' and Pott's Fractures and How to Prevent Them

DR. DUNCAN EVE, JR., Nashville: To attain good results four things are necessary: (1) a correct diagnosis; (2) a careful comparison of the affected side with the sound side; the location of bony prominences in relation to each other must be carefully considered; (3) do not attempt reduction of a fracture about a joint except under an anesthetic; it saves pain and suffering to the patient; (4) if possible make a roentgenogram. Do not immobilize the fingers. Remove all splints in three weeks' time. If the patient continues to suffer great pain two or three days after reduction, the fracture has not been reduced.

Indications for the Operative Treatment of Fractures

DR. BATTLE MALONE, Memphis: Fractures in which the open treatment may be considered should be divided into five classes. 1. Those fractures which we do not expect to unite by bony union, (*a*) fractures of the olecranon and fractures of the patella, with rupture of the capsule, and (*b*) fractures of the neck of the femur. In my own experience most of the cases of nonunion of the neck of the femur have been those in which the fracture was not recognized, and was not treated at all for several months. Such cases demand operation, provided no contraindications are to be found in the age of the patient or other conditions. 2. Fracture dislocations, especially fractures of the surgical neck of the humerus, with dislocation of the head and, of less frequent occurrence, fracture of the femur complicated by a hip joint dislocation. 3. Fractures of the condyles of the humerus, T and Y fractures of the elbow, fractures of the femoral condyles, complicated Pott's fractures. Each case must be considered as it arises. 4. Fractures of the shaft of the long bones cannot always be treated successfully without direct fixation. 5. Fractures in which operation is to be considered is where nonunion is present. The only method of treatment of nonunion is by autogenous bone transplantation.

DISCUSSION

DR. E. DUNBAR NEWELL, Chattanooga: A most important point in the treatment of Colles' and Pott's fractures is proper diagnosis, and the only way to diagnose these cases properly is to use the Roentgen ray. After a proper diagnosis has been made, it makes little difference what kind of splint is applied. Proper approximation of the fractures is very important. With reference to plating a fracture of the upper third of the femur, I believe that is going too far. It is unjustifiable. Mr. Lane claims that he has 100 per cent. of recoveries in these cases, but his associates say that he is mistaken about that.

DR. WILLIAM BRITT BURNS, Memphis: Some years ago I objected to too much plating and to the application of too much hardware. I have been old fashioned enough to believe that I could get results without plating. Most of my plating has been done in compound fractures, and in some instances of double multiple fractures. With the exception of a little necrosis, I have not had occasion to regret this practice. I believe logical fixation in plating is the bone plate.

DR. S. R. MILLER, Knoxville: There are a great many compound comminuted fractures, cases of Barton's fractures, and other serious fractures about the wrist joint that are not typical Colles' fractures, and you cannot hold them in position with a simple dressing of any character. In order to hold a fracture with a simple splint or any kind of splint it must be a typical Colles' fracture, and not comminuted, or not a Barton's fracture or some other complicated fracture.

Ectopic Pregnancy

DR. T. G. POLLARD, Nashville: Primary rupture may be partial or slight, or it may be complete or even fatal. If complete, a subsequent rupture or ruptures is the rule. With a rupture free hemorrhage, more or less severe, occurs, and it may prove fatal. The loss of blood may be through one rapid fatal hemorrhage, or there may be a series of lesser hemorrhages. Recovery may take place without operation. Patients with ectopic pregnancy, even if in good condition, with or without rupture, are almost certain to have future trouble and should have an operation as soon as possible.

DISCUSSION

DR. E. M. SANDERS, Nashville: We have found in our work that the leukocyte count, temperature and pulse, examination from below, examination of abdomen, and all that which we get outside of the history, is very confusing. However, I do not believe a careful history is a most important factor in arriving at a diagnosis of ectopic pregnancy. The history should be taken several times, if possible. We had one patient in whom the hemorrhage was not simply a bloody discharge, but a real uterine hemorrhage, and at the operation it was easy to pass a probe from the sac through the tube on into the uterus. I do not think that flushing out the abdomen should be done. With reference to drainage, in the subacute cases we are dealing with infection, and it is best to drain some of them, and when it is done it should be done from below.

Duodenal Ulcer

DR. J. S. B. WOOLFORD, Chattanooga: In the cases with mild symptoms we should try medical treatment. I give strontium bromid before meals, in 10 or 15 grain doses, and a pill of silver nitrate, one-fourth grain, with one-half grain of hyoscyamus. This treatment, coupled with a diet that is calculated to leave the least amount of residue and produce the least amount of irritation, will sometimes give relief, and some patients apparently recover. Inasmuch as some of these patients frequently suffer from constipation, the question of overcoming this condition is an important one. The frequent and unnecessary administration of cathartic medicines and laxatives of various kinds is harmful. It would be more rational therapeutics to advise the use of an enema or injection of a few drams of glycerin when necessary, and by this means give the duodenum as much peristaltic rest as possible, thus allowing the ulcer a better opportunity to heal. If symptoms recur and an operation becomes necessary, then the surgeon should open the abdomen through a right rectus incision and make a posterior gastro-enterostomy.

DISCUSSION

DR. HERMAN J. BARNETT, Chattanooga: It seems to me that we have not progressed far enough yet to be absolutely sure that the appendix is not the cause of a great deal of duodenal and gastric ulcer. The frequent occurrence of these conditions in those cases of neglected appendicitis, and the fact that we almost always observe a Lane kink or some form of stasis in the intestine, associated with these conditions, leads me to believe they are the etiologic cause of ulcer. Eleven of my patients gave a history of acute appendicitis that had been neglected.

DR. FRANK A. JONES, Memphis: Moynihan gave utterance to an expression in his book on duodenal and gastric ulcer which, in my own opinion, has been fraught with considerable harm to the diagnostic world. He made the statement

in italics that "any chronic, recurrent hyperchlorhydria is duodenal and gastric ulcer." In the abstract, that, in a great many cases, proves correct; but I have on repeated occasions seen this not verified at the operating table. It proved not to be gastric or duodenal ulcer, but gallstones with cholecystitis.

Colossal Goiters

DR. WILLIAM D. HAGGARD, Nashville: Clinically these larger growths are, as a rule, either colloid, which is the classical and more frequent form of goiter, or cystic growths or adenomas. The adenomas are usually soft and doughy. They begin, as a rule, in the lateral lobes, but on account of the pressure of the muscles are often forced to the center, where they protrude as a round, tense, globular mass in front of the neck. Inasmuch as they are encapsulated, it is impossible for any form of medication to have any effect on an adenoma any more than it would on a sebaceous cyst of the back. Although medication is useless, enucleation in the early stages can be quickly and safely performed without removal of the gland. When, however, they are multiple, one must remove the larger and most diseased lobe and can often either resect the remaining side, according to the method of Mikulicz, or enucleate isolated adenomatous masses with a very satisfactory prospect of cure. The enormous cysts can be shelled out with considerable rapidity. The so-called goiter heart which so often attends these cases of diffuse, fibrous or colloid goiter is generally due to pressure on the vessels and dilatation of the right heart. Both chambers may be affected and the heart muscles so thinned out that a mild cardiac degeneration is brought about which gives the patient the characteristic breathlessness which so often attends goiter. In glands which are permitted to attain a large size, it is not uncommon for a portion or all of the enlargement to develop behind the sternum and into the thorax. This has been called floating, plunging or diving goiter. They are difficult to diagnose, except by the help of the Roentgen ray or dulness on percussion over the sternum. One should suspect the condition when the patient is unable to stoop with comfort. When these colossal growths are symptomless there is no indication for their removal. The time is coming when we shall give these cases more thorough treatment in the beginning, or early surgical removal when necessary.

DISCUSSION

DR. E. J. JOHNSON, Memphis: I should like to impress on the general practitioner the importance of recognizing and advising that so-called innocent goiters be considered surgical. Dr. Haggard has shown that in practically every case these goiters at some time or another in the life of the individual become surgical.

DR. E. M. HOLDER, Memphis: There is no such condition as an innocent goiter. It has been said that every drop of blood in the human body goes through a goiter every hour of the life of that individual. Just think of the enormous amount of disturbance that may result from a goiter. The same principle applies to the exophthalmic type. If we operate and the goiter is lobulated or there is an isthmus between the lobes, if the patient is not in prime condition and if the operation is extensive, the suggestion Dr. Haggard made of operating in two stages, thus conserving the patient as much as possible, and avoiding shock, is an excellent one.

Acute and Chronic Rheumatism

DR. FRANK BILLINGS, Chicago: Acute rheumatism has long been recognized as an infectious disease. The organism has been designated as *Streptococcus rheumaticus*, *Diplococcus rheumaticus*, or *Micrococcus rheumaticus*. With the phenomenal work done by Rosenow in connection with new methods of bacterial culture in our clinic, we practically always find the organism in the exudate or in the tissues of the patient. We can then make a culture of it, can inject it into animals, producing the disease, and can recover it from the animal again. Acute articular rheumatism is an infectious disease due to a form of streptococcus; that streptococcus is specific in the production of the syndrome we call acute rheumatic fever, just as the pneumococcus is in producing ordinary lobar pneumonia. It has been proved by investigation that the organism in both acute and chronic rheumatism is hematogenous in its method of infection; the organisms passing through the smaller blood vessels of the tissues are caught by the endothelium of the vessel, producing cellular proliferation and obstruction of the blood vessel, so that in acute conditions one finds the blood vessel obstructed with minute hemorrhages at that point into the infected tissue. We have no specific for the treatment of acute rheumatism. Salicylic acid and its derivatives, if used early and in massive doses, often will produce miraculous results. If used later or inefficiently at the beginning, they do not have any effect except as analgesics. They diminish pain, but they do not stop the course of the disease. In acute rheumatism do not be afraid to give large doses of the salicylates in the first forty-eight hours; after that diminish the dosage, but do not stop the salicylates, and often you will stop the disease. Alkalies are supposed to diminish the effects of the streptococcus on the heart. They apparently do intensify the effect of the salicylates, but that is all one can say. For acute rheumatism, vaccines have been used. If we are going to follow any principle in treatment in vaccination, we must stop and ask what these vaccines are expected to do. In acute infectious disorders, vaccines have not proved efficacious. When the living organisms in the body do not excite enough antibodies it is not reasonable to inject more dead bacteria into the tissue to excite the defences. Phylacogen or rheumophylacogen preparations are being used all over the country for rheumatism. In the advertisement of a certain pharmaceutic firm there is a report of 15,000 cases of rheumatism in which recovery ensued in 12,000 with the use of rheumophylocogen. I have been practicing medicine for thirty-five years, and I have not seen patients die from acute rheumatism per se. I have seen them die from the sequelae, that is, of heart conditions later in life, etc. My professional friends know that I have not a good opinion of these preparations.

Etiology and Experimental Production of Appendicitis, Ulcer of the Stomach and Cholecystitis

DR. EDWARD C. ROSENOW, Chicago: The demonstration of streptococci in the focus of infection at the time of an attack of appendicitis that has an affinity for the appendix when injected intravenously into animals, it seems to me, is good evidence, together with all the other facts, that the growth of the organism in the throat or in the focus of infection is primary, and that the disease in the appendix is a result of this, not by the swallowing of bacteria, but by embolic infection, getting into the circulation and finding in the appendix a favorable spot for its growth. When you couple that with the fact that when the attack is over you can go back and make cultures from the same spot, and inject animals in the same way with cultures made as before, and not one animal in the series develops a single lesion, you have evidence of the cause of appendicitis. I do not care whether there is infection of the throat or not. There is no reason why it should not be so. If you have a case of arthritis you say it is an embolic infection. Why not here? Aschoff and others assert that mechanical factors play an important rôle in the causation of appendicitis. They say that the first attack of appendicitis is due to a previous infection, which causes the formation of fecal concretions, and hence the mechanical factor. I feel that these things are primary and the other things are secondary. The same thing can be said with reference to cases of ulcer of the stomach and of cholecystitis.

We have heard much in regard to the importance of various foci of infection. The breaking of the continuity of surface, the epithelium of the skin, the breaking of the continuity of mucous membranes anywhere should be regarded as a serious matter. We know the relationship of slight abrasions to highly virulent streptococcic infection. After demonstrating the presence of bacteria of low virulence in this type of infection in cases of cholecystitis and

V. 191

appendicitis, why not believe they are also important? The focus is not only the place of entrance, but also the infection atrium. The transmutation of streptococci has been established. In one instance there is an affinity for joints, in another for the appendix, and in still others for the stomach and for the gallbladder. These types of streptococci are so much alike in their cultural characteristics and morphology that it is difficult to differentiate them; but when injected as isolated, they are different in their actions in animals. Therefore it is absurd to hope to get good results by buying streptococcus vaccines at the drug stores and using them for these various diseases. What good will streptococcus vaccines manufactured by various commercial laboratories do in these cases? A vaccine should be developed and given for each specific disease. Only autogenous vaccines should be used. In order to have autogenous vaccines, the microorganism must be proved; then you can proceed to treat the case intelligently.

Diagnosis and Choice of Operation in Certain Affections of the Stomach and Duodenum

DR. J. M. T. FINNEY, Baltimore: Pyloroplasty has its greatest indication in the relief of pyloric stenosis due to chronic ulcer, situated at or near the pylorus, or resulting from cicatricial contractions in the healing of such ulcers. It is often a useful procedure in case of hemorrhage due to gastric ulcer on the lesser curvature or to duodenal ulcer, which cannot be controlled medically, and which threatens the life of the patient, as well as in the chronic dyspepsias due to ulcers which have not been relieved by medical treatment. Contraindications to the operation are inability to mobilize the duodenum when its lesions are too dense, and thickening and infiltration about the plyorus due to hypertrophic forms of ulceration; in atony or gastroptosis, with slight motor insufficiency; in gastric disturbances not dependent on organic disease and in cancer of the stomach. This procedure affords the opportunity to excise all ulcers and also the application of treatment to ulcers. It does not greatly disturb the normal relationship between the stomach and intestines, as is the case in other operations. The immediate as well as the final results are most encouraging. The end-results in 100 gastro-enterostomy cases showed a percentage of 77.2 per cent. of satisfactory recovery; in the pyloroplasty cases a percentage of 88.6 per cent. of complete cures.

THE AMERICAN ASSOCIATION FOR CANCER RESEARCH

Eighth Annual Meeting, held in St. Louis, April 1, 1915.

Primary Spontaneous Tumors of Liver in Mice.

DRS. MAUD SLYE, HARRIET F. HOLMES and H. G. WELLS, Chicago: Primary tumors of the liver are rare in mice, only twenty-three having been found in 9,000 mice of all ages, dying natural deaths and carefully examined at necropsy. All were liver cell adenomas, one showing malignant structure with multiple metastases in the lung, two showing malignant structure without metastases, and the remainder exhibiting all gradations from probable malignancy to simple adenomas. The mouse liver is not subject to cirrhosis, and these growths are not encapsulated. No tumors of bile duct type were found. Sarcomalike growths were found in four, but these are probably granulomas. No hemangiomas or other tumors were found. There were three carcinomas secondary to mammary gland tumors, and one secondary sarcoma. None of the tumors were associated with cestode infection of the liver or other evident cause. All occurred in mice of highly cancerous ancestry, and none were found in approximately 3,000 necropsies of mice of noncancerous ancestry. The coexistence of liver tumors with other primary tumors is high, there having been multiple tumors in nine of the twenty-three cases; in three both primary tumors were hepatic; in the other six different organs were involved. Only four secondary tumors were found in the liver, three being metastatic from mammary gland carcinomas, and one from a mesenteric sarcoma.

Tumors of the Japanese Waltzing Mouse and Its Hybrids

DR. E. E. TYZZER, Boston: A spontaneous carcinoma occurring in the Japanese waltzing mouse could be successfully implanted into over 95 per cent. of the same race. It does not "take" when inoculated into the common mouse. If these two races be mated, the hybrids "take" the inoculation in about 95 per cent. If hybrids be mated, the second and third generations of hybrids give practically 100 per cent. of negative inoculations. Metastasis formation in mice growing this tumor occurs in a high percentage of cases. Massage of the tumor increases the incidence of metastases, which also occur earlier. This indicates the danger of undue manipulation of tumors. Filtration, centrifugation and drying of this tumor have each failed to indicate a causative agent apart from the living tumor cell.

Transplantation of Fowl Sarcoma (Rous) by Injecting the Filtered Citrated Blood Plasma of an Infected Fowl

DRS. G. H. A. CLOWES and B. T. SIMPSON, Buffalo: We took blood directly from the vessels of the neck in two chickens carrying implanted spindle-cell sarcomas (Rous). The blood was at once introduced into a cold solution of aqueous citrate. The plasma was separated by centrifugalization. One portion of the plasma was injected without further treatment. A second portion was filtered through a coarse grade Berkefeld bougie previous to injection. The bougie was subsequently tested and found to be impervious to cultures of *Bacillus prodigiosus*. Each of these portions was introduced into the breast muscles of a number of chickens. Tumors were produced by the injection both of the filtered and of the unfiltered portions. In view of the fact that the injection either of whole blood or of corpuscles or of serum of defibrinated blood have all hitherto given negative results, the conclusion is tentatively drawn that the addition of a small amount of citrate to the blood serves as the fibrile agent.

Chemical Studies on the Serum of Chicken Sarcoma

MR. CASIMIR FUNK, New York: Within recent years, several methods for the serum diagnosis of cancer have been advised, but were found to give unreliable results. In contrast to these methods, which are based on the biologic properties of the serum, the present paper deals with the differences found by chemical analysis. For the preliminary study, serum of chicken inoculated with Rous' sarcoma was analyzed, and the average figures obtained from twenty-two malignant cases, as compared with twenty-two normal serums, showed diminution in the total nitrogen, phosphorus, sulphur and chlorids, but an increase in the ammonia nitrogen and the sugar. The differences found here are apparently due to anemia, and are so pronounced because of the short period over which the animals survive with a tumor. Analogous results were obtained in a few instances with rat serum from animals bearing a sarcoma. In human serums the chemical analysis has failed thus far to reveal any important changes, so that here a more detailed analysis and investigation of the serum is necessary.

Action of Radium on Transplanted Tumors of Animals

DR. F. C. WOOD and DR. FREDERICK PRIME, JR., New York: Most of the reported clinical observations are of little value. In many the tumor had not been microscopically diagnosticated, and the time and distance of the radium from the tumor not given. Even the amount of the radium used could rarely be estimated from the reports. A long series of experiments on mouse and rat tumors has shown that very much longer exposures were required to kill the cancer cells than had hitherto been thought. The results were plotted in a curve which showed that, the distance from the tube being the same, the only factors were the time and the quality of radium element employed. Dr. Wood said that the exposures required were about the same as for human carcinomas.

(To be continued)

Current Medical Literature

AMERICAN

Titles marked with an asterisk (*) are abstracted below.

American Journal of Obstetrics and Diseases of Women and Children, York, Pa.

April, LXXI, No. 4, pp. 561-720

1 *Movable Retrodisplacements of Uterus. D. Bissell, New York.
2 Rôle of Pelvic Fascia as Uterine Support. J. T. Williams, Boston.
3 *Treatment of Placenta Praevia. J. F. Winn, Richmond, Va.
4 *Newer Methods for Clinical Examination of Blood. R. Weiss, Basel.
5 Sacro-Iliac Strain. K. C. Corley, Washington, D. C.
6 Mode of Termination in Ectopic Gestation; Report of Seven Cases. H. J. Hartz, Philadelphia.
7 *Significance of Noncoagulable Nitrogen Coefficient of Blood Serum in Pregnancy and Toxemias of Pregnancy. E. D. Plass, Baltimore.
8 Occiput Posterior Positions. F. L. Adair, Minneapolis.
9 Significance of Uterine Hemorrhage. H. W. Yates, Detroit.
10 Combined Local and General Anesthesia in Major Surgery. L. Frank, Louisville, Ky.
11 Primary Carcinoma of Liver in Child. M. A. Tate, Cincinnati.
12 Leukorrhea. D. H. Stewart, New York.

1. **Movable Retrodisplacements of Uterus.**—Bissell summarizes his paper as follows: The ability of the pelvic fascial diaphragm to restore and maintain the uterus in the extreme anterior or horizontal position is the key to the situation. So long as the uterus is in the standard position, all forces directed from above on it and its adjacent structures are shared equally by the group of tissues constituting the fascial diaphragm, but as the corpus recedes the distribution of the forces becomes more and more unequal and the liability to permanent loss of equilibrium is greater and greater. Nature has provided the round, broad and utero-sacral ligaments as additional safeguards to be called on when the loss of equilibrium is threatened. Any factor or combination of factors, congenital or acquired, which discourages the resumption or maintenance of the uterus in standard position, encourages an unequal distribution of the forces expended on the fascial diaphragm with retrodisplacement as the eventual result.

3. **Treatment of Placenta Praevia.**—Before viability, both in home and hospital practice, Winn states, the Braxton Hicks method of version is demanded. After viability, provided the child is in good condition, the intra-ovular use of the elastic rubber bag followed by internal podalic version offers the best result for both the mother and child. In home practice, when the bag is not available, Braxton Hicks' version again should be the treatment. During labor, in complete or partial placenta praevia, with great loss of blood, the child either dead or possessing little chance of living, Braxton-Hicks' version offers the best results for the mother.

Whenever Braxton Hicks' version is employed it should always be followed by slow extraction. All efforts at rapid delivery by dragging the child through an undilated cervix will be followed by most disastrous consequences to the mother. For the milder varieties of placenta praevia, the marginal and lateral, simply puncturing the membranes is generally the only thing necessary to control the hemorrhage. The cervical and vaginal tampon is a makeshift at best, and if at all should be used under rigid aseptic conditions and other precautions well defined.

Cesarean section in Winn's opinion has a restricted place in placenta praevia. It should be chosen under the following conditions; with the approach of full term, the placenta covering a great part of the whole of the os; the hemorrhage profuse, but not enough to make the mother a bad surgical risk; the child probably weakened, yet offering reasonable prospects of being saved; the cervix in a condition suggestive of prolonged and difficult dilatation; a negative history of vaginal contamination; and, the assurance of hospital technic.

4. **Clinical Examination of Blood.**—Weiss describes methods of examination which, he says, are so accurate that 1/1000 of a milligram of uric acid or a trace of sugar in the blood can be tested with absolute accuracy. The original paper should be consulted for details.

7. **Coefficient of Blood Serum in Pregnancy.**—Plass claims that the noncoagulable nitrogen coefficient is a better index of kidney function than the total noncoagulable nitrogen alone. In the toxemias of pregnancy and in eclampsia the noncoagulable nitrogen coefficient seems to be of some value in prognosticating the degree of permanent kidney change and in differentiating renal from hepatic toxemias. Possibly, if the noncoagulable nitrogen coefficient were determined in other renal disorders, not especially connected with pregnancy, additional information might be obtained which would increase the clinical and prognostic value of the test.

American Journal of Physiology, Baltimore

April, XXXVII, No. 1, pp. 1-176

13 Studies on Growth of Man. I. Prenatal and Postnatal Growth of Infants. T. B. Robertson, San Francisco.
14 *Variations in Coronary Pressure, and Their Bearing on Relaxation Rate of Ventricles. A. L. Prince, Hartford, Conn.
15 *Contribution to Physiology of Stomach. Secretion of Gastric Juice in Man. A. J. Carlson, Chicago.
16 Studies on Growth of Man. II. Postnatal Loss of Weight in Infants and Compensatory Overgrowth Which Succeeds It. T. B. Robertson, San Francisco.
17 *Vascular Tone and Distribution of Blood in Surgical Shock. R. A. Morison and D. R. Hooker, Baltimore.
18 Some Characteristics of Vasomotor Reflexes. P. G. Stiles and E. G. Martin, Boston.
19 *Study of Causes of Respiratory Change of Heart Rate. C. D. Snyder, Baltimore.
20 Electrical Studies in Mammalian Reflexes. A. Forbes and A. Gregg, Boston.

14. **Variations in Coronary Pressure.**—Prince found that the relaxation rate of the ventricles is not affected by variations in arterial pressure. This speaks against theories ascribing to the heart a suction action brought about either by the tension or changes of tension in the coronary vessels.

15. **Secretion of Gastric Juice in Man.**—A healthy male, 29 years of age, was the subject of Carlson's study. He has had a complete cicatricial stenosis of the esophagus since the age of 9. Food is introduced into the stomach through a gastric fistula after it has been masticated. Carlson summarizes his findings as follows: The fluid contents of the "empty" stomach varies from 8 c.c. to 50 c.c., with an average of 20 c.c. The quantity is greater in the morning than at noon or at 6 p. m., greater in the summer than in the winter months. The gastric glands in the normal person are never completely quiescent. The continuous secretion varies from 2 to 50 c.c. per hour. The secretion is rich in pepsin, but when the secretion rate is very low it is poor in hydrochloric acid. Chewing of indifferent substances, and stimulation of the nerve endings in the mouth by substances not related to food do not cause secretion of gastric juice; that is, these processes do not augment the continuous gastric secretion.

Seeing, smelling and possibly thinking of palatable food usually cause a slight but very transitory secretion of gastric juice. The rate of secretion of gastric juice on mastication of palatable food is directly proportional to the palatability of the food. During mastication the average rate is 3.5 c.c. per minute (minimum rate, 1.4 c.c.; maximum rate, 10.8 c.c.). On cessation of chewing, the secretion rate diminishes rapidly, so that in fifteen to twenty minutes the gastric glands reach the level of the continuous gastric secretion. The chemistry of this appetite gastric juice has been practically constant during the three years of observation. The latent period of the appetite secretion varies indirectly with the rate of the continuous secretion, so that when the continuous secretion is abundant the appetite secretion shows no latent period at all, while with the lowest rate of the continuous secretion, the latent period varies from two to four minutes. This latent period is therefore one of the processes of secretion in the gland cells, and not in the nervous mechanism. It is estimated that an adult normal person secretes on an average meal (dinner) 700 c.c. gastric juice, or an average total of 1,500 c.c. of gastric juice in twenty-four hours.

V. 191

17. **Vascular Tone in Surgical Shock.**—The observations made by Morison and Hooker show that both the systemic and portal venous pressures fall in shock. The weight of an isolated loop of gut is increased in shock, a fact interpreted to mean loss of local vascular tone. This loss of tone may be arterial or venous, or both. Their evidence indicates loss of venous tone, which would predicate failure of the venopressor mechanism and a stagnation of venous blood. Perfusion of vascular areas, temporarily isolated for observation, shows a decreased rate of flow in shock.

19. **Respiratory Change of Heart Rate.**—The thesis presented by Snyder is said to be new in so far as it gives proof of a different character from that given by previous workers, showing that the cause of respiratory change of heart rate is in the spinal bulb and not in any peripheral mechanism; is an automatic and not a reflex mechanism. It opposes the view that this cause is in the activity of the expiratory center. It gives positive proof that the agent lies rather in the activity of the inspiratory center. It is inclined to regard the mechanism as rather a depression of vagal center than a stimulation of the hypothetical accelerator center.

Boston Medical and Surgical Journal

April 8, CLXXII, No. 14, pp. 503-538

21 Cases of Perineal Prostatectomy. F. G. Balch, Boston.
22 *Fixation of Fractured Bones in Infants and Young Children. E. H. Bradford and R. Soutter, Boston.
23 Border-Line Cases of Mental Defect, with Special Reference to Hysterical Symptoms. C. C. Beckley, Lancaster.
24 Somatic Characteristics of General Paretics. D. Gregg, Brookline.

April 15, No. 15, pp. 539-574

25 New Preparation for Pyelography. E. L. Young, Jr., Boston.
26 Dangers in Handling Food by Persons Afflicted with Communicable Diseases. E. O. Otis, A. J. McLaughlin, H. Linenthal, C. Floyd, A. Post, T. K. Cory and H. Abrahams, Boston.
27 Recent Extension of Outpatient Work in Massachusetts Hospitals for Insane. A. W. Stearns, Boston.

22. **Fixation of Fractured Bones in Infants and Young Children.**—In attempting to steady two broken fragments of bone, supports are fitted to which the fragments are fastened, reaching a considerable distance above and below the point of solution of continuity. By means of a long bone drill, with an eye at the point, the broken bone was pierced and strong thirty-day catgut threads passed through the eye of the needle thrust through the skin. On withdrawing the needle the catgut is pulled through the bone. No dissection is necessary, as the bone drill is readily thrust through the skin down to the bone. Palpation and the roentgenogram were sufficient guides for the proper placing of the catgut in the fragments of the bone. Any needed number of catgut cords can be passed. The skin is protected by a layer of fat-free leather, which will soften when wet and harden rapidly into stiffness. This leather soaked in alcohol is sterilized and placed around the limb and the catgut threads passed through it. Small wood coaptation splints are then placed in desired places, pressing on the side of the limb, one to check a forward and backward movement of the fragments and another to prevent sideplay.

Traction is then applied to the limb, coaptation splints held in position, and the catgut threads passed through the fractured bone are tied to the coaptation wood strips, thus firmly lashing the fragments in proper position to a firm splint; over the whole a second layer of alcohol softened leather can be placed, held by a firm bandage, and the limb secured in a wire splint. The leather softened in alcohol hardens quickly on the evaporation of the alcohol and in a short time the fractured limb is held in a stiff leather splint firmly. The position can at any time be determined by roentgenogram. In the cases (young children) in which the method was used the leather splints and wood side splints were removed in four weeks, the catgut having softened and the fracture being firmly healed.

Illinois Medical Journal, Chicago

April, XXVII, No. 4, pp. 257-336

28 Eutocia by Means of Nitrous Oxid and Oxygen Analgesia—Safe Substitute for Freiburg Method. F. W. Lynch, Chicago.
29 Is Twilight Sleep to Be "For Me"—Blessing—or Curse? A. L. Maun, Elgin.
30 Dermatoses of Pregnancy. E. A. Fischkin, Chicago.
31 Acute Abdomen in Children. D. N Eisendrath and A. A. Strauss, Chicago.
32 Traumatic Hernia. C. W. Hopkins, Chicago.
33 Bill to Regulate Expert Testimony. H. N. Moyer, Chicago.
34 Tumors of Bladder. C. Martin, St. Louis.
35 Madelung's Deformity of Wrist. W. R. Parkes, Evanston.
36 Some Practical Points in Treatment of Traumatic Joint Affections by Massage and Mobilization. H. A. Oldenborg, Chicago.
37 Roentgen Ray Aid in Diagnosis of Stomach and Colon Conditions. N. H. Lowry, Chicago.
38 Experimental and Clinical Work on Sterility. V. D. Lespinasse, Chicago.
39 Eugenics and Physician. M. D. Henderson, Opdyke.
40 Puerperal Sepsis. R. N. Lane, Gibson City.
41 Pyelitis in Children. G. J. Laben, Papineau.

Journal of Experimental Medicine, Lancaster, Pa.

April, XXI, No. 4, pp. 289-400

42 *Comparison of Adult and Infant Types of Gonococci. L. Pearce, New York.
43 *Studies on Experimental Pneumonia in Rabbits. B. S. Kline and M. C. Winternitz, Baltimore.
44 *Id. VIII. Intra-Vitam Staining in Experimental Pneumonia, and Circulation in Pneumonic Lung. B. S. Kline and M. C. Winternitz, Baltimore.
45* Id. IX. Part of Leukocyte in Immunity Reaction. M. C. Winternitz and B. S. Kline, Baltimore.
46 *Influence of Epinephrin on Coronary Circulation of Monkey. H. G. Barbour and A. L. Prince, New Haven, Conn.
47 *Test for Antithrombin in Blood. A. F. Hess, New York.
48 Changes in Biologic Properties of Trypanosoma Lewisi Produced by Experimental Means, with Especial Reference to Virulence. W. H. Brown, New York.
49 *Influence of Milk Feeding on Mortality and Growth, and on Character of Intestinal Flora. L. F. Rettger, New Haven, Conn.
50 *Concentration of Protective Bodies in Antipneumococcus Serum by Means of Specific Precipitation. F. P. Gay and H. T. Chickering, New York.

42. **Comparison of Adult and Infant Types of Gonococci.**—According to Pearce two principal types of gonococci may be recognized by suitable immunologic tests; namely, agglutination and complement fixation. These two types correspond to the adult and infant types of infection with the gonococcus, seen clinically. On the basis of the immunologic reactions of agglutination and complement fixation the strains of gonococci isolated from three cases of ophthalmia are classed with the adult type. A polyvalent antigen for the serologic diagnosis of a gonococcus infection should represent strains of the infant type of organism in order that both types of infection, infant as well as adult, may be recognized.

43. **Experimental Pneumonia in Rabbits.**—Kline and Winternitz found that the production of lobar pneumonia in rabbits is dependent on the introduction of organisms into the alveoli themselves. In order to accomplish this the catheter through which they are injected must be inserted as deeply into a bronchus as possible and the culture fluid injected with considerable force. Large numbers of organisms injected into the trachea just beyond the larynx set up no great changes in the lungs, even though the injection be forcible. This fact suggests the presence of a protective mechanism in the upper air passages, which, under normal conditions, prevents the penetration of organisms into the lungs. If animals be subjected to cold, alcohol and the inhalation of irritating gases, the so-called secondary factors in the etiology of lobar pneumonia in man, then the injection of pneumococci into the trachea causes inflammatory changes of the upper respiratory tract and occasionally pneumonia. The vagi prevent foreign material in the pharynx and upper respiratory tract from reaching the lungs. Section of one vagus may be followed by pneumonia, while section of both invariably leads to this result. It is possible that the secondary factors mentioned above owe their action to their influence on the vagus control of the upper respiratory tract.

44. **Intra Vitam Staining in Experimental Pneumonia and Circulation in Pneumonic Lung.**—Kline and Winternitz in this study found that the impaired circulation in the pneumonic lung results from the wide distribution of capillary fibrin thrombi. In man these are, as a rule, distributed with relative uniformity. The impairment of the circulation is of importance in bringing about resolution. Only enough

blood is allowed to seep through the vessels to nourish the alveolar walls. Consequently very little serum escapes into the alveoli and the autolysis of the exudate by the leukocytes is unhindered. The impairment of the circulation seriously interferes with the action of intravenous therapy on the local lesion. The exudate in the pneumonic lung can be readily impregnated with a dye injected intrabronchially. This suggests a method of administration of therapeutic agents in pneumonia.

45. **Leukocyte in Immunity Reaction.**—It is concluded by Winternitz and Kline that there are at least three elements necessary in the immunization process: (1) Immune bodies, (2) white blood cells, and (3) a third factor which is dependent for its existence on the presence of white blood cells at the time of inoculation of the pneumococci. Furthermore, this third factor may be removed if the animal is inoculated at a time when it is aplastic.

46. **Influence of Epinephrin on Monkey.**—Decrease in coronary flow was the constant response of freshly isolated monkey hearts to epinephrin. These hearts were perfused by Barbour and Prince with autogenous hirudinized blood diluted with Locke solution. The results were constant at high or low perfusion pressures, in beating or resting hearts, and with all adequate doses. Increased coronary flow was obtained constantly in rabbit hearts under identical conditions. In the light of previous work on isolated human coronary arteries, the general conclusion is drawn by the authors, that, while actively dilating the coronary vessels in the dog, cat, rabbit, ox, sheep and pig, epinephrin constricts the coronary vessels in man and the monkey. The coronary arteries of the last two species are presumably supplied with constrictor nerves of true sympathetic (thoracicolumbar) origin.

47. **Test for Antithrombin in Blood.**—A test is described by Hess for the estimation of antithrombin in the blood. The chief advantage of the test is that it is simple, and does not require the preparation of fibrinogen and of thrombin, which are difficult to prepare and to maintain in a pure state. The principle consists in titrating the antithrombin against normal human plasma; in this way obtaining an estimation of its power to delay coagulation. As the result of examinations carried out by this method, it would seem that there is a wide factor of safety as regards the amount of antithrombin in the human blood, and that this inhibiting substance may be increased to a considerable degree without markedly delaying or endangering clotting.

49. **Influence of Milk Feeding on Mortality.**—The favorable influence of milk feeding on mortality and growth was most apparent to Rettger in his experiments. Mortality from all causes was frequently reduced to at least one-half of that obtained among the chicks that received no milk, while the milk-fed chicks in some experiments gained twice as much in weight as those that were without this article of diet. Although the influence of milk feeding was less pronounced on the mortality of chicks that were artificially infected with *Bacterium pullorum*, quite an appreciable difference in mortality was always noted if the milk was fed at least one or two days before the first administration of the bouillon cultures of the organism in question. Practically the same results were obtained, whether sweet or sour milk was fed, and no differences could be observed in the relative value of ordinary sour milk and of the so-called bulgaricus product. Hence the unique properties of this food exist in the milk as such rather than in any milk acids or milk bacteria that may be present.

50. **Protective Bodies in Antipneumococcus Serum.**—The addition of a water-clear extract of pneumococci to homologous antiserum by Gay and Chickering in their work produces a voluminous precipitate which carries down with it the agglutinins and practically the totality of the protective bodies against pneumococcus infection in animals. This precipitate when washed and resuspended in saline solution to the original volume of serum protects as well as the whole serum. The protein content of such solutions has varied from 0.09 to 0.34 per cent., as contrasted with about 6 per cent. in the original serum. The solution of this precipitate is not necessary to insure protection, and when produced by dilute alkali (sodium hydrate) frequently destroys the immune bodies.

Journal-Lancet, Minneapolis

April 1, XXXV, No. 7, pp. 165-192

51 *Report of Typhoid Prophylactic Vaccination in Two Thousand Cases with Studies of Widal Reaction. C. C. Burlingame, Fergus Falls.
52 Common Errors in Gall Tract Surgery. C. E. Ruth, Des Moines, Ia.
53 Roentgen-ray Treatment of Uterine Myomas and Metrorrhagias. M. A. Stern, Sioux Falls, S. Dak.
54 Bacteriology of Eustachian Tube. C. F. Coulter and C. H. Pierce, Wadena.
55 Tonsils in Relation to Systemic Disease. E. H. Parker, Minneapolis.

51. Abstracted in THE JOURNAL, Nov. 7, 1914, p. 1692.

Medical Record, New York

April 10, LXXXVII, No. 15, pp. 589-630

56 Treatment of Diabetes Mellitus in Dispensaries. H. O. Mosenthal, Baltimore.
57 *Neurasthenia Among Garment Workers. V. C. Baker, New York.
58 Influence of Study of Medicine on Rabelais. D. W. Montgomery, San Francisco.
59 *Scopolamin-Narcophin Anesthesia (Twilight Sleep) in Labor. K. E. Schloessingk, Freiburg, Germany.
60 Important Group of Skin Diseases (Tinea). C. F. Pabst, Brooklyn.
61 Two Cases of Laryngeal Obstruction, and of Piece of Turbinate in Lung. C. Graef, New York.
62 Two Cases of Monocular Optic Neuritis. H. F. Hansell, Philadelphia.
63 Non-Bacterial Urethritis. P. I. Nixon, San Antonio, Tex.
64 Causes of Persistency and Incurability of Certain Affections of Genito-Urinary Tract. A. Strachstein, New York.
65 Electrical Mouth Light. A. Kahn, New York.

April 17, No. 16, pp. 631-672

66 Advantages of Medical Associations. E. C. Register, Charlotte, N. C.
67 Gonorrhea in Women. W. J. Robinson, New York.
68 Physical Basis for Moral and Mental Deficiencies. H. M. Friedman, New York.
69 *Gonorrhea Treated with Succinimid of Mercury Administered Intramuscularly. G. B. Lake, U. S. Army.
70 *Use of Decanted Blood Serum after Severe Hemorrhage and in Hemophilia: Report of Two Cases. A. Judd, New York.
71 Retention of Salvarsan. W. J. McGurn, Boston.
72 New Instrument for Scarifying in von Pirquet Cutaneous Tuberculin Test. W. H. Luckett, New York.

57. **Neurasthenia Among Garment Workers.**—Eighteen cases were selected by Baker for statistics, because of the absence of organic diseases: Neurasthenia, 6 cases; neurasthenic spines, 4 cases; neurasthenia with gastric neuroses, 2 cases; nervous headaches, 2 cases; mucous colitis, 1 case; neurasthenia with obesity, 1 case; sexual neurasthenia, 2 cases. The length of time at the garment trade varied from six months to twenty-three years. The family history in three cases stated the mother to be neurotic. In one of these instances the mother was insane. The illness in all but two cases developed during their employment in the garment industry. Of these two, one began to have "nervous trouble" in childhood and the other dates her illness from the time she started to work. The conclusions as to symptoms peculiar to the trade showed only one, the painful spines, to be prevalent. The occurrence of other symptoms, such as anemia, constipation, eye-strain, decreased chest expansion, and permanent deformities, were not strikingly prominent features. One girl had a lateral curvature of the spine, which was present before she became a garment worker. The others were negative as to deformity.

59. Also published in ILLINOIS MEDICAL JOURNAL, February, 1915, p. 774.

69. **Gonorrhea Treated with Succinimid of Mercury.**—The technic of giving the injections of mercury described by Lake is as follows: The syringe must be all glass, and it and the needles, which are better made of platinum, must be carefully sterilized by boiling. The desired dose of the mercury salt is dissolved in 1 or 1.5 c.c. of hot water. The site of injection (usually the buttock) is sterilized with

V. 191

tincture of iodin and the needle is plunged deeply into the muscular tissues, the fluid ejected and the needle withdrawn. The spot is then once more touched with iodin. There is considerable pain for an hour or two after the injection, but in all of these cases this has passed away promptly (usually within twenty-four hours), leaving no bad effects. Two cases had what appeared to be a reaction to the drug, as in them the temperature rose after all injections and subsided promptly without any treatment, leaving no unpleasant results. Several cases developed a mild stomatitis, which subsided in a few days. Lake is giving 65 mg. or more of the mercury succinimid as an initial dose in every case. He believes that a second smaller dose (40 mg.) should follow the first after from three to six days, especially if the gonococci do not disappear within that time. Nineteen cases are cited.

70. **Use of Decanted Blood Serum After Severe Hemorrhage and in Hemophilia.**—Such an amount of blood is taken by Judd from the cephalic or other prominent vein of the donor as will answer the need or as the donor can spare. In the case of a baby, 180 c.c. of serum represented 450 c.c. of blood obtained from the mother in two separate sittings. The mother was an extremely healthy, full-blooded woman. No harm beyond a simple anemia, which quickly responded to treatment, resulted to the mother. The result to the child was very satisfactory. After drawing the blood from the vein into a clean, sterilized glass vessel it is put into an incubator for a half hour, although this is not absolutely necessary provided a temperature of blood heat is maintained. It is then placed on ice or in a thoroughly cool place, protected by cotton from the air until the blood separates from the clot. From one to twelve hours is required. The serum is then decanted and kept in a cool place until needed. It can be kept for several days if on ice. An ordinary glass or metal aspirating syringe answers the purpose of injecting admirably.

Military Surgeon, Chicago

April, XXXVI, No. 4, pp. 305-404

73 Guide to Facilitate Organization and Administration of Independent Sanitary Command in Field. G. P. Peed, U. S. Army.
74 New Ward Tent for Field Hospitals—Its Advantages as Observed at Field Hospital No. 3, Texas City—Method of Closing in Tent for Winter Months. W. H. Smith, U. S. Army.
75 Emergency Hospital of Panama-Pacific Exposition. R. M. Woodward, U. S. P. H. Service.
76 Hygiene Exhibits of Panama-Pacific International Exposition. J. R. Hurley, U. S. P. H. Service.
77 Medical Meetings at Panama-Pacific Exposition. L. O. Reese.
78 Hernia Adiposa. H. S. Mathewson, U. S. P. H. Service.
79 Case of Gunshot Wound of Head. J. R. Church, U. S. Army.

New York Medical Journal

April 10, CI, No. 15, pp. 709-764

80 Trials and Triumphs of Surgeon. J. C. Da Costa, Philadelphia.
81 *Colloidal Gold Test on Spinal Fluid; in Paresis and Other Mental Diseases. C. J. Swalm and A. L. Mann, Norristown, Pa.
82 Ataxia of Tabes. M. Grossman, New York.
83 Treatment of Puerperal Sepsis. R. T. Frank, New York.
84 Splanchnic Neurasthenia and Its Treatment. A. B. Hirsh, Philadelphia.
85 Chronic Nephritis. A. W. Hollis, New York.
86 Medical Records of Indian Campaigns of Generals St. Clair, Harmar and Wayne. O. Juettner, Cincinnati.
87 Normal Nasal Septum and Pathology of Deflections. F. O. Lewis, Philadelphia.
88 Some Difficulties in Cystoscopy. C. C. A. Lange, New York.

April 17, No. 16, pp. 765-816

89 Psychopathology of Neurosis. (To be concluded.) B. Sidis, Portsmouth, N. H.
90 Limitations of Functional Tests of Kidneys. V. C. Pedersen, New York.
91 Misapplied Bone Surgery. H. A. Wilson, Philadelphia.
92 Perforation or Rupture of Gravid Uterus Bicornis Unicollis. D. W. Tovey, New York.
93 High Cost of Advertising. W. Brady, Elmira.
94 Comparison of American and European Methods. J. H. Schrup, Dubuque, Ia.
95 Joint Tuberculosis. L. W. Ely, San Francisco.
96 Relation of Physicians to Public School System. I. S. Wile, New York.
97 Physician's Life. M. Ginsburg, Philadelphia.
98 Present Status of Syphilis Therapy Abroad. A. Strachstein, New York.

81. **Gold Test in Mental Disease.**—The psychiatric cases tested by Swalm and Mann all reacted to the extent of one or two plus in the first tubes, and hence no reaction less than three plus or dark blue was recorded as positive. In paresis the test was of great value in diagnosis, at least 90 per cent. providing the typical curve, the true specificity of which the authors doubt. They advise that the goldsol test should be used in conjunction with the serum and spinal fluid Wassermann reaction, globulin tests, and cell count, as a more delicate method of interpreting their results and to correct them when they fail. The cases of tabes furnished a marked luetic curve in 50 per cent.; cases of cerebrospinal syphilis in 60 per cent. Nonluetic psychoses produced weak reactions, without characteristic curves, so far as was ascertained.

Ophthalmic Record, Chicago

April, XXIV, No. 4, pp. 163-222

99 Homonymous Crescentic Scotomas in Association with Ethmoiditis and Tooth Root Abscess. G. E. de Schweinitz, Philadelphia.
100 Intranasal Drainage of Lachrymal Sac—Simple Method. J. A. Pratt, Aurora.
101 Aqueoplasty; or Zorab Operation for Glaucoma. C. A. Wood, Chicago.
102 Retained Silk-Thread or "Seton" Drainage from Vitreous Chamber to Tenon's Lymph Channel for Relief of Glaucoma. D. T. Vail, Cincinnati.
103 Two Examples of Peculiar Form of Retinal Pigmentation (Stephenson). B. Chance, Philadelphia.
104 Specific Treatment of Morax-Axenfeld Conjunctivitis. H. S. Gradle, Chicago.

Philippine Journal of Science, Manila

November, IX, No. 6, pp. 465-528

105 *Germicidal Power of Glycerin on Various Micro-Organisms Under Various Conditions. E. H. Ruediger, Manila.
106 Vitality of Cholera Vibrio in Manila Waters. O. Schöbl, Manila.
107 Morphology of Adults of Filaria Found in Philippine Islands. E. L. Walker, Manila.
108 Pelvimetry and Cephalometry Among Filipinas. H. Acosta-Sison, Manila.
109 Physiologic Action of Proteoses. R. B. Gibson, Manila.
110 Lymphagogic Action of Philippine Mago, Mangifera Indica Linneus. R. B. Gibson and I. Concepción, Manila.
111 Observations on Mango Rash. I. Concepción, Manila.
112 *Milk Poisoning Due to Type of Staphylococcus Albus Occurring in Udder of Healthy Cow. M. A. Barber, Manila.

105. **Germicidal Power of Glycerin.**—Tests were made by Ruediger in order to obtain accurate information as to the extent that glycerin may be relied on to sterilize bacterial vaccines. He found that glycerin has a distinct, although feeble germicidal action. The germicidal action varies greatly with the temperature, being much feebler at a temperature of 15 C. than at from 30 to 35 C. The germicidal action varies with the diluent employed; in glycerin diluted with physiologic salt solution the micro-organisms died much sooner than in glycerin diluted with bouillon or with horse serum. In dilutions up to 50 per cent. glycerin did not destroy the bacillus of anthrax in fifteen days. This may be due to the presence of spores. Glycerin seems to be a selective poison for the bacillus of plague, the spirillum of cholera, and the bacillus of diphtheria. In 50 per cent. of glycerin in physiologic salt solution all the non-spore-forming organisms died in less than four days.

112. **Milk Poisoning Occurring in Udder of Healthy Cow.**—The most noteworthy points of Barber's paper are the following: Acute attacks of gastro-enteritis were produced in milk by a toxin elaborated by a white staphylococcus which occurred in almost pure culture in the udder of a cow. The fresh milk was harmless, and the toxin was produced in effective quantities only after the milk had stood some hours at room temperature. Repeated attacks of the illness had occurred among residents and visitors at the farm during a period of three years, and the cow was apparently in good health during this time, except for one attack of garget, which occurred after the cases of gastro-enteritis had begun.

Persons who had used the milk continuously had apparently developed some tolerance to the toxin. Two children of the family had used the milk regularly, but never had attacks. The adults had occasional light attacks or, in

one or two cases, some chronic intestinal trouble. In his case, four acute attacks, three of them severe, afforded no protection against a subsequent fifth dose. Visitors at the farm and Filipino employees who used the milk less regularly showed most severe attacks. Since the discontinuance of the use of raw milk from this cow, all trouble has ceased. Culturally, the toxin-producing staphylococcus differed little from a nontoxin-producing strain, except that the former produced acid in mannite and maltose litmus agars. Agglutination tests with the serum of a person who had recently suffered five attacks and that of a person who had long used the milk showed little, if any, positive result. In guinea pigs and monkeys the toxin-producing strain showed more tendency to form abscesses than a yellow staphylococcus from the same source.

Public Health Journal, Toronto

April, VI, No. 4, pp. 153-200

113 "Live a Little Longer," Rochester Plan. M. E. Bingeman, Rochester, N. Y.
114 Salesmanship and Business Building. G. W. Allen.
115 Some Theories and Methods of Ventilation. E. W. J. Hague, Winnipeg.
116 Replacing Cannon Fodder. C. G. Sutherland, Moose Jaw, Sask.

United States Naval Medical Bulletin, Washington

April, IX, No. 2, pp. 179-352

117 Operative Treatment of Chronic Intestinal Stasis. W. S. Bainbridge, U. S. Navy.
118 Symposium on Intelligence Tests. R. Sheehan, U. S. Navy.
119 Value of Mental Test and Its Relation to Service. G. E. Thomas, U. S. Navy.
120 Mental Defectives at Naval Disciplinary Barracks, Port Royal, S. C. H. E. Jenkins, U. S. Navy.
121 Mental Tests in Examination of Applicants for Enlistment. A. R. Schier, U. S. Navy.
122 Observations on Deep Diving. G. R. W. French, U. S. Navy.
123 Tuberculosis. E. Thompson, U. S. Navy.
124 Seven Cases of Cerebrospinal Fever. D. C. Cather, U. S. Navy.
125 Posterior Urethra and Bladder in Hundred Cases of Chronic Gonorrhea. A. L. Clifton, U. S. Navy.
126 Apparatus for Securing Traction of Lower Extremities. H. A. Dunn, U. S. Navy.
127 Leukopenia of Marked Degree in Fatal Case of Pneumonia. E. R. Stitt, U. S. Navy.
128 Gastric Changes Following Gastro-Enterostomy. H. F. Hull and O. J. Mink, U. S. Navy.
129 Two Cases of Malaria Treated with Salvarsan. E. U. Reed, U. S. Navy.
130 Pseudoleukemic Anemia of Infancy Occurring in Twins. S. Walker, U. S. Navy.

FOREIGN

Titles marked with an asterisk (*) are abstracted below. Single case reports and trials of new drugs are usually omitted.

British Medical Journal, London

April 3, I, No. 2831, pp. 581-624

1 Acute Appendicular Obstruction. S. T. Irwin.
2 *Autogenous Living Vaccine in Typhoid. E. A. Bourke, I. D. Evans and S. Rowland.
3 Modification of Wassermann Reaction. F. D. Bana.
4 Insects and War; Mosquito. A. E. Shipley.
5 General Anesthesia for Eye Operations. T. H. Butler.
6 Myeloid Sarcoma of Femur, with Pathologic Fracture. W. S. George and A. H. Todd.
7 *Treatment of Dry Pleurisy by Artificial Pneumothorax. G. Lucas.
8 Two Cases of Angioneurotic Edema. F. L. Davis.

2. **Autogenous Living Vaccine in Typhoid.**—The authors having recently treated cases of enteric fever with vaccine and obtained satisfactory results, concluded that better results might be obtained by employing autogenous living vaccine for each case. Their cases have demonstrated that this method of injecting living bacilli in suitable doses is perfectly safe. The vaccine was injected subcutaneously, as a rule in the pectoral region and was followed by very slight local reaction, but marked general reaction. No local or general complications were observed. The injection, as a rule, was followed by a sharp rise in temperature within the first few hours, followed by a marked fall within twenty-four hours of inoculation. Careful notes were made and in their minds there is no doubt that this treatment had a beneficial effect and tended to cut short the duration of the disease. It promotes perspiration, the aspect of the patient undoubtedly becomes brighter after injection, and the tongue becomes much cleaner. Several of the cases on admission to the hospital gave the impression that the attack would be severe; in this opinion the consulting physician agreed.

The disease was in each case diagnosed by means of blood culture. For this purpose 5 c.c. of blood were drawn from the arm and immediately transferred to 1 per cent. sodium taurocholate. From this a broth culture was prepared, and the purity and identity of the growth verified by agglutination and sugar fermentation tests. The broth culture was reinoculated into fresh broth every day and itself constituted the vaccine. No further preparation whatever was employed. The age of the culture used was generally eighteen hours, and the number of bacilli contained in it was obtained by a direct method of counting. The average number of organisms ranged from 60,000,000 to 300,000,000. These preliminary observations have demonstrated that a living culture of the typhoid bacillus can be injected subcutaneously into enteric patients, not only without any deleterious effects whatever, but, as far as the six cases reported show, with decided favorable influence on the course of the disease.

7. **Treatment of Dry Pleurisy by Artificial Pneumothorax.**—Lucas reports a case which illustrates the benefit which may be derived from temporary separation of the two inflamed surfaces of pleura in a case of long standing dry pleurisy by a layer of nitrogen, which in this way acts as a pneumatic splint. A woman, aged 50, whose right kidney had been removed for tuberculous disease, had a sharp attack of dry pleurisy in September, 1913, the pain from which had continued ever since. In January, 1914, four small hemoptyses occurred, for which the patient was confined to bed for a month. There was a further small hemoptysis in the beginning of March.

Examination of the chest revealed a healed tuberculous lesion at the left apex. There were signs of much dry pleurisy over the middle and lower lobes on the right side, a coarse leathery rub being audible from the fourth rib in front and the sixth dorsal vertebra behind, downward to the base of the lung. Acute pain was complained of over this site. The patient was kept at rest in bed and the usual palliative methods of treatment adopted without bringing about any amelioration of the symptoms. Throughout this period the temperature and pulse rate were normal. The possibility of producing a partial temporary artificial pneumothorax was suggested and accepted.

On Oct. 11, 1914, under the influence of a local anesthetic given half an hour previously, a Saugmann's needle was introduced into the sixth right intercostal space in the posterior axillary line. No difficulty was experienced in finding the interval between the parietal and visceral layers of the pleura, and 200 c.c. of nitrogen were introduced. On the following day the patient still complained of pain, and on October 13 a further injection of 300 c.c. of nitrogen was given at the same site. On the day following auscultation showed the breath sounds over the right base to be distant and no pleural rub was audible. Pain was distinctly relieved, though still present at the end of a deep inspiration. On October 18 a further quantity of 300 c.c. of nitrogen was introduced, which had the effect of entirely abolishing the pain, even at the end of deep inspiration. At no time during the periods of injection of nitrogen were there any signs of intrapleural fluid, nor was there any disturbance of the temperature or pulse rate. The after-history of the case was uneventful.

Lancet, London

April 3, I, No. 4779, pp. 689-736

9 *New Psychiatry. W. H. B. Steddart.
10 Cerebrospinal Meningitis. E. N. Butler.
11 Tampon for Controlling Severed Intercostal Artery. J. F. McMillan.
12 *Psychology of Traumatic Amblyopia Following Explosion of Shells. J. H. Parsons.
13 Heterologous Transplantation; Mouse Tumors in Rats. W. E. Bullock.

V. 191

14 *Sperm Oil Tubercle Bacilli. A. H. Miller.
15 Pneumococcal Infections Treated with Autogenous Vaccines. N. Raw.

9. **"Projection" as an Indicator of Repressed Complexes.**—Stoddart in the Morison lectures on the new psychiatry, says an important psychologic mechanism which often serves as an indicator of repressed complexes, not only in nervous disorder but also in everyday life, is "projection." The peculiarity of this phenomenon is that the effects of the repressed complex are attributed by the individual possessing it, not to himself, but to some other person. A few examples will explain his meaning. People who are guilty of some failing, imperfection or weakness, of which they are ashamed, are exceedingly liable to attribute the same fault to others. If a thief loses an article, his first thought is that somebody has stolen it from him, and the man who is ever ready to disbelieve any statement made to him is himself a person who is habitually economical of the truth. The dishonest financier is always on the alert lest somebody should swindle him, and he is exceedingly intolerant of anybody who succeeds in doing so. The man who is unfaithful to his wife is usually suspicious that she may have been unfaithful to him, and how often have we all heard an asylum patient declare that his wife is insane, or a drunkard accuse his consort of insobriety. Self-reproach is so unpleasant to consciousness that it is repressed and sublimated into reproach of other people.

12. **Psychology of Traumatic Amblyopia Following Explosion of Shells.**—Parsons describes a typical case as follows: A man after more or less prolonged fatigue, induced by marching and exposure in the trenches, is incapacitated by the explosion of a shell in his immediate vicinity. He may be merely knocked down or thrown into the air, and more or less seriously injured or wounded by concussion, shrapnel bullets, or shell splinters. Consciousness is lost for a variable time, but often not so far as to prevent automatic movements, so that the man may walk in a dazed condition to a dressing station. The mental equilibrium at this stage is much disturbed, and all memory of this phase is usually lost. The most striking feature of the case is that the man is instantaneously struck blind. The blindness may be associated with deafness, loss of smell and loss of taste, but all these are less frequent than the blindness. On examination it is found that there are intense blepharospasm and lacrymation.

The lids are opened with great difficulty and examination of the eyes is almost impossible. The author is not aware of any record of the condition of the pupils at this stage. In the course of a week or two the blepharospasm diminishes and it becomes possible to examine the fundi. Of course, there may be local injury to the eye, but in uncomplicated cases the eyes are found to be normal. The pupils react to light, though in some cases the reactions are sluggish, and sometimes one pupil differs from the other, being larger, or more sluggish in its reactions. The fundi appear to be absolutely normal. By this time probably some restoration of sight has occurred. Light is perceived and large objects may be distinguished. As improvement occurs the patient manages to grope about, usually with his hands outstretched before him, and it is noteworthy that he does not usually stumble up against objects in his path. As soon as it is possible to take the fields of vision it is found that they are markedly contracted, and that indeed to a degree which seems scarcely consistent with the avoidance of obstacles in walking. The recovery of vision is slow, but eventually it seems always to be complete.

There are several suspicious symptoms in many such cases. The eye to recover last is often the shooting eye. Some patients show an obvious disinclination to return to duty. Some candidly admit to being in a "blue funk." In all there has been a complete mental upset, sometimes accompanied by hysteric symptoms—outbursts of weeping, etc., in the early stages. These features render it only too easy to jump to the conclusion that there is often a large element of shamming in the case. It is because there is very grave danger of cruel injustice being done to men who have faced the music and come battered out of the ordeal that Parsons attempts to an explanation of the underlying psychology. Since there is no demonstrable organic lesion these cases may be regarded as examples of injuries or wounds of consciousness. This does not imply that there is no neural lesion to account for the psychologic disorder, but merely that it has hitherto escaped observation. Parson adopts the view of parallelism between physiologic neural processes and psychologic events or changes in consciousness.

In the case of a soldier under shell fire the man is usually bodily fatigued, whereby his control is impaired. He has "the fear of death before his eyes" and is in a state of acute excitement, whereby his normal judgment is impaired. These conditions conspire to give his innate instincts ungoverned play. On the other hand, positive self-feeling, aided by suggestion and imitation and the sentiments of patriotism, the honor of the regiment, his own honor and so on, enforce his volitional control. At last, however, the shock comes which strikes him unconscious. It is not to be supposed that he is thereby anesthetized to these emotional storms. It is rather to be conjectured that he is rendered "subconscious," and hence the more a victim of his lower instincts. This view is supported by the emotional behavior of the men in the early stages, and by the fact that many of their actions can be revived by hypnosis.

The unconsciousness in these cases is to be explained physiologically by an abrogation of the functions of the highest level cortical cells. Recovery shows that the cells are not irretrievably damaged, and it is most likely that the block occurs on the afferent paths at the synapses of these cortical cells. Consciousness returns, but there is blindness. So far as objective evidence goes the lower visual paths are intact and function normally. The optic nerves carry their impulses, at any rate, as far as the pupil reactions are concerned. The condition resembles uremic amaurosis. Parsons has seen it also in children after post basic meningitis. The block is somewhere above the so-called primary optic centers—external geniculate bodies, optic thalami and superior colliculi. It, too, is probably in the synapses of the cortical cells, in this case the synapses of the fibers of the optic radiations. Sometimes such a block occurs physiologically and it is probably to be explained in the same manner.

14. **Sperm Oil Tubercle Bacilli.**—Miller makes a second communication on sperm oil cultures of tubercle bacilli (see *Lancet*, London, Sept. 19, 1914, for the first article). More recently the crude sperm oil has been used. The organism on the crude oil seems to grow better and more quickly than on the refined oil. For the oil medium the bacilli must be known to be actively growing. With actively growing bacilli there is often a definite moist growth in about twelve days' time, but the bacilli themselves are apparently no different from those obtained from the usual sources. It takes a further period of from three to four weeks before the changes described and illustrated begin to become visible.

The term "beading" that was used in his former communication is not an accurate description of the organism in all cases, especially in its earlier stages and with the lower percentages of oil (2.5), for the staining parts and the non-staining parts of the organism are then often in the form of definite long segments. Later, when with the richer oil mixtures the granules begin to develop and the segments to become broken up, the term "beading" is perhaps better. The organism grows on the surface of 5 per cent. crude oil and 5 per cent. glycerin as a thick uniform greasy pellicle. Microscopically it alters considerably in shape and form; it begins to branch. Branching is also seen in the refined oil (5 per cent.), but not to so great an extent. The stage of growth described shows branching forms here and there in a field, the remainder of the field being occupied by rod segments. The rod segments also are more filamentous and irregular, the latter from the breaking up of their substance by the formation of granules and in some of them by the

presence of little offshoots, the beginnings or the stumps of their ramifications. At the same time they stain with greater difficulty. The staining portions of the segments do not as a rule stain with their usual vividness. The slide requires to be well heated for eight or more minutes.

Branching appears in most cases to occur in cases in which there is a large "granule" present. In others, small lateral offshoots seem to arise from the segments without any granule being visible, possibly false branching. Granules form in the segments as they grow, and they in their turn give off other segments. Further evidence that these "granules" are essentially bodies whose function is to germinate can be seen in animal inoculation. A 2-months old growth on 5 per cent. refined oil and 6 per cent. glycerin was ground up with olive oil in the proportion of two loopfuls of growth to a cubic centimeter of olive oil and then injected intraperitoneally into a guinea-pig. The animal died twenty-two days later. The necropsy showed the liver, spleen, omentum and glands nearly solid with tubercles. A portion of the tuberculous material was then placed in a mortar, and films were made of the expressed juice.

Microscopically, there were a large number of bacilli present, some 20 to 30 in a field, nearly all of which were beaded, the remainder being of the ordinary rod form. The "granule" or "spore-body" is generally larger than the culture "granule"; it is also sharply defined and intensely stained, and has attached to it the bacillary portion of the organism. There are also forms present in which two "spore-bodies" are fused together, not in juxtaposition, with their bacillary portions issuing out at opposite poles. They are not so commonly met with as the single form. With the above characteristic it is difficult to regard these bodies in any way as degenerative. The bacillary, or rod portion, of the organism varies in length and in staining power. The long forms may have more than one spore-body in their length. In their manner of staining they are to be found in all stages, from not staining at all with carbolfuchsin to being firmly acid-alcohol fast.

Archives Mens. d'Obst. et de Gynécologie, Paris

December, III, No. 12, pp. 241-284

16 *The Blood Pressure as Element in the Prognosis with Severe Obstetric Hemorrhage. (La tension artérielle minima élément de pronostic des hémorrhagies graves de la grossesse.) P. Balard.

16. **The Blood Pressure as Element in Prognosis with Hemorrhage.**—Balard recalls that with slow and gradual obstetric hemorrhage, the blood count will show the indications and the risks of intervention. Comparison of the number of reds with the degree of the reaction shows whether or not the organism is capable of resistance. With sudden hemorrhage our only means of information are the pulse and the blood pressure. A sudden and persistent drop in the blood pressure shows the great loss of blood and the inability of the organism to compensate for it by reenforcing or accelerating the contractions of the myocardium. In estimating the blood pressure, the minimal pressure is much more instructive than the maximal, as Pachon reported in 1913, urging that the minimal arterial pressure be accepted as the standard for comparison. The pulse was absolutely imperceptible after repeated severe losses of blood at term in one case, but the oscillometer showed some movement and under stimulants and saline infusion the minimal pressure was 5 cm. mercury, the maximal 7. Half an hour later the minimal was 6.5, the maximal 10, but the patient did not rouse and in three hours was dead. The pulse had been 160 and 156. In another case, apparently as severe, the minimal pressure was 7, the maximal 9, and the figures increased to 7.5 and 11 and then to 8.5 and 12 while the pulse kept at 100 or 104 throughout. A turn for the better was soon apparent and recovery followed.

The maximal pressure may vary within a wide range, but a minimal pressure of 5 cm. mercury seems to be the lowest limit at which the blood is able to keep circulating. Even the slightest movement, or other cause inducing transient reduction of the minimal pressure below this point, will probably arrest the circulation permanently. On the other hand, everything should be done to raise the pressure above this danger point. Not only saline infusion, but also transfusion of blood may be required. The minimal pressure is also instructive in shock from any cause. The oscillometer records movements in the vessel when the pulse is absolutely imperceptible. In the fatal case mentioned, the swing of the oscillometer was only 0.5 or 1, while it was 1.5 in the case with favorable outcome.

Bulletin de l'Académie de Médecine, Paris

March 16, LXXIII, No. 11, pp. 333-352

17 The Trench Foot. (24 observations de gelure des extrémités inférieures.) M. de Fleury.

18 Painful Type of Injury of the Median Nerve. P. Marie and Mme. A. Bénisty.

19 *Special Electric Reaction During Regeneration of Nerves. P. Cottenot and P. Reinhold.

20 Tetragenus Infection; Twenty-Five Cases. F. Trémolières and P. Loew.

21 Measures to Prevent Crippling among the Wounded. (Physiothérapie préventive dans les blessures de guerre.) Laquerrière and Peyré.

19. **Special Electric Reaction during Regeneration of Nerve.**—The reaction referred to occurs when volitional control of movements is just beginning to return after an injury of a nerve. Below the point of injury electric tests elicit merely a total reaction of degeneration, but above the lesion the reaction is normal. This contrast between the totally pathologic and entirely normal responses below and above was noticed in nine of 500 cases of wounds of nerves in the war.

21. **Prevention of Crippling.**—This communication emphasizes that continuing immobilization too long is the main factor in producing crippling among the wounded. Surgeons, nurses and other attendants must have it hammered into them that it is not enough to dress the wound and reduce a fracture; they must act promptly to ward off later deformity. The base hospitals should have the rule placarded that absolute immobilization is required only extremely exceptionally. The part should be exercised at once, with massage also if possible. The mobilization should be done with great caution and care, under close supervision, studying the cause of any functional impotency encountered. No wound or fracture should have immobilization applied to more than the actual part where it is needed; with a fracture of the humerus, for example, the hand and fingers should be left free. In one case in which this was not done, the man was left with ankylosis of the shoulder and elbow and likewise of the wrist and all the fingers. The parts should be exercised early and often, and apparatus that can be removed to permit this and massage should be given the preference. Another mistake too often made is to delay operating on a wounded nerve. By prompt intervention degeneration is prevented while the operation itself is much easier. Another point to which attention is called is the necessity for early detection of hysterotraumatic and other nervous affections. The longer they go without proper treatment, the harder they are to cure.

Archiv für Gynaekologie, Berlin

CIV, No. 1, pp. 1-187. Last indexed January 23, p. 374

22 *Self-Infection of Parturients. (Zur Frage der Selbstinfektion.) W. Zangemeister and F. Kirstein.

23 Normal and Pathologic Physiology of the Menstruation Cycle. R. Schröder.

24 Action of Certain Uterus Tonics on the General Circulation. (Wirkung einiger Uterustonika auf die Zirkulation mit spezieller Berücksichtigung des kleinen Kreislaufes.) E. Anderes.

25 *Placenta Praevia and Advantages of External Version Therewith. E. Zalewski.

26 Drop in Weight with Rise of Temperature in the Newly Born. (Zusammenhang zwischen Gewichtsabnahme und Temperatursteigerungen beim Neugeborenen—Hungerfieber.) A. Mayer.

22. **Self-Infection of Parturients.**—Zangemeister compares a number of reports from various maternities all of which sustain his assertions that the presence of streptococci in the vagina at the onset of delivery favors the development of fever at the time or later. In three series from his own experience, only from 0 to 7 per cent. of the parturients had

a febrile puerperium when no streptococci had been found in the vagina; in 14, 16 and 32 per cent. there was a febrile course when streptococci had been found that did not display hemolytic properties, and 55, 50 and 75 per cent. developed fever of those presenting hemolytic streptococci. From other data cited is shown further that the presence of hemolytic streptococci renders the course of events much more unfavorable with instrumental delivery. Kirstein presents evidence that even the so-called intoxication fever is usually associated with the presence of hemolytic streptococci, even when there has been no examination liable to import germs from without. When none could be found outside of the hymen, none could be discovered inside of it. The vagina may be already sheltering putrefaction-producing bacteria at the onset of labor, and consequently a putrid amniotic fluid does not necessarily imply that any one connected with the management of the case is to be incriminated.

25. **Placenta Praevia and External Version.**—In Zalewski's 192 cases of placenta praevia since 1900, fully 75 per cent. of the women belonged to the working classes and only 7.3 per cent. were primiparae. These facts seem to suggest that possibly some endometritic or other changes in the uterine mucosa must be responsible for the abnormal insertion of the placenta. Some form of placenta praevia was found on an average once to every eighty or ninety maternity cases. He urges that every woman found to have placenta praevia should be sent to a hospital without delay and without tamponing. This ensures the best conditions for the woman and relieves the attending physician of a grave responsibility. The mortality for the mothers was 9 per cent. and for the children 61 per cent. in the 66 cases in which he applied combined version; 3.8 per cent. for the mothers and 73 for the children in the 53 cases in which the inflatable bag was used, and 0 for the mothers and 53.5 per cent. for the children in the 45 cases in which external version was performed. There was laceration of the cervix in 7 of the 66 cases in which combined version was applied but none in the other groups.

Berliner klinische Wochenschrift

March 15, LII, No. 11, pp. 257-280

27 *War and Traumatic Neuroses. H. Oppenheim.
28 Magnesium Sulphate in Tetanus. S. J. Meltzer (New York).
29 The Albumin Requirement. (Der Eiweissbedarf des Menschen.) F. Hirschfeld.
30 *Tetanus in the Field. A. Goldscheider. Commenced in No. 10.
31 Acid Dressing to Check Pyocyaneus Suppuration. (Zur Bekämpfung des Pyocyaneus-Eiters.) E. Unger.

March 22, No. 12, pp. 281-308

32 *Treatment of Eczema in Oozing Stage. (Nässende Ekzeme.) P. G. Unna.
33 *Importance of Laminectomy for Wounds of the Spinal Cord in War. E. Meyer.
34 Protein Supply During the War. (Deckung des Eiweissbedarfes im Kriege.) E. Salkowski.
35 *Familial Gastric Cancer. (Familien-Magenkrebs.) P. K. Pel.
36 *Arrest of Hemorrhage on the Battle Field. (Blutstillung auf dem Schlachtfelde.) Wiewiorowski.
37 Congenital Affection Resembling Mikulicz' Disease. (Hypertrophia congenita glandularum salivarium cum lymphomate colli congenito.) J. W. M. Indemans.
38 Rational Dietary for Working Man. (Kost der Arbeiter.) A. Gigon and F. Hirschfeld.

27. **War and Traumatic Neuroses.**—Oppenheim recalls the opposition elicited by his statements in 1889 as to the possibility of traumatic injury of nerve tissue being sufficient to affect its functioning while yet beyond detection by microscopic or other examination. He compares it to a magnet; no difference is perceptible between the iron of a magnet and that of a non-magnet. His assumption of the possibility of traumatic neuroses had to contend with the views of those who suspected simulation or "indemnity hysteria" in all cases of nervous symptoms without manifest organic lesions. The psychiatrists, on the other hand, insisted that merely the emotions connected with the trauma and indemnity were responsible for the symptoms. The workmen's compensation legislation imposed a burden of new tasks on physicians, rather foreign to their regular work of relieving and curing the sick, as the process of making out certificates in accident cases has so many legal and psychologic features. Cases of traumatic nervous affections following an accident are dreaded by physicians as they take up time and impose great responsibility, and many annoyances are connected therewith. This state of mind does not conduce to free and impartial estimation of conditions. The consequence was that the conception of traumatic neuroses sank deeper and deeper into discredit and Oppenheim, as the father of the traumatic neurosis, was viewed askance by the profession. He declares that it actually blighted his career to a certain extent, but the present war has vindicated him and established the traumatic neurosis on a solid scientific basis while deepening our knowledge of it. There can be no question of simulation in these war cases; any tendency to this would be in the line of simulating health, to get release from the restrictions of hospital environment. In many cases the traumatic neurosis accompanies an actual organic lesion of some part of the nervous system. What possible advantage could it be for a man with a wound in the skull or spine to simulate a superposed syndrome? The war traumatic neuroses include some hitherto little known forms of paralysis, such as reflex paralysis and inability to move a limb or certain group of muscles because the man seems to have forgotten how to use them. Oppenheim calls this latter akinesia amnestica. It has nothing to do with hysteria, but a tendency to hysteria may favor its development and retard its cure. In other cases the paralysis seems to be the result of injury of gray matter secondary to a wound of the forearm or elsewhere, so that this part of the gray matter is locked up against impulses sent to it from the brain—conditions thus being analogous to arthrogenous atrophy. In a case of this total reflex paralysis described, electric tests elicited normal responses and there was nothing to indicate a psychogenic affection. A bullet had fractured the humerus but the arm could be used normally after the fracture had healed till finally atrophy and paresis of the entire arm developed, with flail joint and abolished tendon phenomena.

30. **Tetanus.**—Goldscheider regards as very instructive for the prognosis the way in which the symptoms develop. When they are several days in developing, the outlook is more favorable, regardless of the duration of the incubation period. In one case the tetanus developed twenty-seven days after the injury. The syndrome came on rapidly and soon proved fatal. In another case the incubation period was twenty-one days and the man succumbed the third day to the acutely developing tetanus. Since preventive injection of 20 or 40 units of antitetanus serum has been made a routine measure for all the wounded there have been no further cases of tetanus. Another factor in prophylaxis is to ward off sudden shocks of all kinds, and all efforts. The wounded are protected against such to the utmost, and when tetanus has developed, even loud speaking and a heavy tread are not allowed. The patient is fed through a tube, to avoid disturbing him. It has been found most convenient to keep the mattress on the floor instead of on a bed. The wounded are watched for any tendency to disturbance in swallowing or any starting at a sudden noise—these are regarded as warning of impending tetanus.

32. **Oozing Eczema.**—Unna says that the simplest method of treating eczema with a serous discharge is to coat it often with a thin layer of a drying paste. This does away with the necessity for dressings and the cocci die off under the influence of the drying and reducing paste. The thinner the layer and the oftener it is applied the better. As the cocci die, the itching subsides. The formula he advises is a mixture of 10 parts sulphur lotum; 10 parts calcium carbonate and 80 parts zinc ointment. This paste is also useful to apply to a vaccination pustule as soon as the vaccine shows that it is going to "take." The course of the pustule is not interfered with but there is no redness or swelling and the whole process is shortened.

33. **Operative Treatment After Wounds of Spinal Cord.**—Meyer's experience with the wounds of this kind in the war has demonstrated, he declares, that from the neurologist's point of view everything is in favor of early laminectomy

when spinal-cord symptoms develop after an injury of the spinal cord and show no signs of speedy and notable improvement.

35. **Familial Gastric Cancer.**—Pel emphasizes that possibly more can be learned with regard to the causation of cancer from scrutiny of familial cases than from extensive general statistics. He has encountered seven cancer families and gives the tree of one. A man whose three brothers died of cancer married a woman whose two brothers died of cancer of the face. Of their nine children, six daughters were healthy, but two daughters and one son died of cancer of the esophagus or stomach as did also the daughter of one of the healthy daughters. There were thus ten cases of malignant disease in the eighteen members of the family in three generations. In another family, five of the seven children of an apparently healthy couple died of gastric cancer without any known cause such as abuse of tobacco or trauma. One of the remaining two children suffers occasionally from the stomach.

In this family the stomach was the only organ affected and the malignant disease did not develop until long after the children had left the home roof and scattered. Pel knows of another family in which three sisters, their mother and grandmother, all died of cancer of the breast. Van Iterson has also reported from Leyden a family of ten persons in two generations of whom eight have succumbed to cancer, including four cases of cancer of the breast. Haeberlin has reported that a history of cancer in the family was found in 10.9 per cent. of 138 cases (gastric cancer in 8 per cent.). A collective inquiry in 1901 as to the prevalence of cancer in Holland, elicited data to the effect that the parents and grandparents had had cancer in 10 per cent. of 878 cases, and that in 18.1 per cent. there was a history of cancer in the family.

36. **To Arrest Hemorrhage in the Wounded.**—Wiewiorowski comments on the impossibility of collecting the wounded in the field during the daytime, on account of the firing, and the difficulty of the work in the dark. The slightest show of a lantern or pocket light brings bullets. He also emphasizes the extreme difficulty in getting the wounded out of the trenches, owing to their narrowness and the zigzag course, while those carrying the wounded have to keep stooping. The result of all this is that the surgeon does not get a chance to arrest hemorrhage; the man has either bled to death or the bleeding has stopped of itself. The jagged soft parts promote coagulation of the blood on them, and as the blood stream grows weaker the clot forms faster.

Another important factor in spontaneous arrest of hemorrhage is that the scraps of shell causing the injury are so hot that they cauterize the tissues. One point on which he expatiates is the harm wrought by incorrectly applied tourniquets. When it is correctly applied, the limb is empty of blood or slightly cyanotic; the veins should never bulge under the skin. The limb should always be raised for some time to expel the blood before the tourniquet is applied. It is not needed when the blood is merely oozing from veins, but only when a large artery or vein has been injured. In short, a tourniquet should not be applied by the untrained. If vessels have to be ligated, this should be done in the wound, but it is better as a rule not to disturb the clots. The wounded can be moved back to the base hospitals but they should be carried, not taken in a conveyance. Saline infusion after much loss of blood should be given without delay even in the field hospital.

Centralblatt für die Grenzgebiete der Med. und Chir., Jena

March, XVIII, No. 6, pp. 507-636. Last indexed November 21, p. 1885

39 *Edema, Stasis and Infection. H. Glasewald.

40 *Purgatives and Mode of Action. (Die Wirkungsweise der Abführmittel und ihre Bedeutung für den Internisten und Chirurgen.) S. G. Rosenberg.

41 *Injury of the Vagus Nerve in the Neck. (Klinik und Therapie der Vagusverletzungen am Halse.) D. G. Zesas.

39. **Edema, Stasis and Infection.**—Glasewald devotes thirty pages to a study of the reciprocal relations between stasis and edema, and the predisposition which they afford to infection. Even Hippocrates noticed that lesions in dropsical tissues showed little tendency to heal, and yet the edema is the curative agent in Bier's stasis hyperemia. A total of 110 articles on the subject are compared, all testifying that edematous tissues are more readily invaded by infection than under other conditions. But this, he demonstrates, is the result of long continued mechanical influences. The stasis hyperemia should never be maintained long enough to damage the cells. If continued too long it would have the same injurious influence as inflammatory edema.

40. **Purgatives.**—Rosenberg discusses in turn the mode of action of the leading purgative drugs, natural and synthetic, emphasizing the necessity for a discriminating selection according to the individual case. Among the fifty-six authors whose works on purgatives are reviewed and compared, he cites Lewin's statement that castor oil is liable to retard the pulse, in addition to its retarding influence on the evacuation of the stomach, and its depressing influence on the appetite. Abuse of purgatives may induce hemorrhoids, jaundice or pruritus, and the resulting congestion in the genital organs in women may lead to prolapse of the uterus or general nervousness. Purgatives should be taken very cautiously if at all during menstruation and pregnancy and also when there is a tendency to hemorrhage. Inflammation in the gastro-intestinal tract, anemia and debility from any cause contraindicate purgatives. He classifies them as those which by osmosis check absorption in the bowel, such as salts, sugar and calomel; those which stimulate peristalsis in the small intestine, oils, colocynth and jalap. Neither of these groups cause griping. This is liable with the third group of purgatives, those which increase peristalsis in the large intestine, sulphur, phenolphthalein, rhubarb, senna, cascara and aloes. This latter group is to be avoided during menstruation and pregnancy. If sulphur is taken too long there may be signs of slight sulphuretted hydrogen poisoning.

41. **Injury of the Pneumogastric Nerve in the Neck.**—Zesas compares 138 articles on this subject. They record 17 cases of traumatic injury from a bullet or stab wound or fracture; 41 of partial resection during operations; 11 cases in which the nerve was divided, and 40 in which it was roughly handled during an operation. Injury of the vagus is liable to slow the pulse and respiration, the degree of this retardation depending on the nature of the injury and the condition of the nerve at the time. The wide individual variation in the symptoms induced may be the result of anastomoses in unusual numbers, but it generally can be explained by the condition of the nerve, the degenerated nerve not being capable of the reaction of the sound nerve. Waitz removed a stretch 3 cm. long of the nerve involved in a cancer, without consecutive symptoms, and Lücke a stretch 12 cm. long without other disturbance than recurrent paralysis. Severing the vagus nerve on one side does not cause any threatening symptoms on the part of the heart or lungs. But irritation of the nerve is liable to induce extremely severe symptoms, possibly complete arrest of heart and lung action. In some cases there are also more or less dyspnea and spasmodic coughing. When severe symptoms develop, Zesas advocates cutting the nerve at once. The fatalities that have followed dividing the vagus in the neck are all amply explained by other circumstances at the operation. The vagotomy was not responsible for them, as used to be supposed. The only drawback is the permanent paralysis of the vocal cord. The vagus nerve sometimes stands traction, compression, etc., but it is more liable to respond with serious symptoms. If cautiously and gently manipulated it will stand a great deal, especially if treated with cocain beforehand. A few instances are on record in which the severed nerve was sutured, but the ultimate outcome is not known except that in Markin's case functioning was restored to the paralyzed vocal cord. Zesas remarks in conclusion that suture of the cocainized nerve seems harmless, and the possibility of restoring the functioning of the vocal cord justifies an attempt in this line. Ordinary suture is more liable to succeed than a graft operation on an adjacent nerve. Only three American works are cited in his compilation.

V. 191

Deutsche medizinische Wochenschrift, Berlin

March 18, XLI, No. 12, pp. 333-360

42 *Necrotic Bone May Still Serve as Support. (Die funktionelle Brauchbarkeit nekrotischer Stützgewebe.) H. Ribbert.
43 Salvarasannatrium. H. Loeb.
44 *Traumatic Ankylosing Arthritis. K. Hirsch. Concluded in No. 13.
45 Massage of the Heart from Below the Diaphragm. H. Weitz.
46 Treatment of Fractured Ribs. (Rippenbrüchen.) W. Gross.
47 Gas Phlegmon in the Pia Mater. Tietze and Korbsch.
48 Elastic Resistance in Medico-Mechanical Exercises. R. Heppe.
49 To Combat Epidemics in War. (Bekämpfung der Kriegsseuchen.) K. Richter. (Bekämpfung der Läuseplage.) H. Teske and F. Rabe.
50 Psychology of Peoples at War. (Völkerpsychologie im Kriege.) J. Schwalbe.

42. **Necrotic Bone.**—In a series of experiments, Ribbert froze the leg of a rabbit, thus inducing complete necrosis of the shaft of the long bone, but after a week or two the animal had entirely recovered the use of the limb and nothing indicated the necrosis withiq. A thin layer of normal bone developed on each side of the necrotic portion and thus enabled it still to serve its purpose as a support. There was no tendency to cast it off as naturally happens when necrotic tissue is near the surface.

44. **Ankylosing Traumatic Arthritis.**—The influence of mere trauma alone seems capable of starting an acute deforming arthritis under some conditions. Hirsch gives an illustrated description of a case of the kind, developing within six weeks after fracture of a metacarpal bone. The deforming process was in the wrist and speedily entailed complete ankylosis without atrophy of the bones in the joint.

Jahrbuch für Kinderheilkunde, Berlin

March, LXXXI, No. 3, pp. 183-276

51 *Induced Antianaphylaxis in Connection with Serum Sickness. (Ueber Serumantianaphylaxie beim Menschen.) G. Bessau.
52 *Treatment of Diphtheria. (Zur Serumtherapie der Diphtherie.) L. Knöspel.
53 *Elimination of Iodin in Children's Urine. (Die Ausscheidung des Jods im Harn der Kinder.) R. Amstad.
54 Favorable Influence of Bee Poison on Chronic Rheumatic Disease in Children. (Versuche zur Anwendung von Bienenstich und Bienengift als Heilmittel bei chronisch-rheumatischen Erkankungen des Kindesalters.) J. Langer.
55 Advantages and Results of Albumin-Milk in Infant Feeding. (Erfolge bei Eiweissmilch-Behandlung.) L. Baron.

51. **Antianaphylaxis.**—Bessau reports the results of research undertaken to determine whether a phase of antianaphylaxis follows regularly after an attack of serum sickness. He investigated the matter on children who had shown signs of anaphylaxis after a single application of serotherapy for scarlet fever, tuberculosis or pneumococcus infection. After injection of a single large dose of the immune serum or tuberculin and development of serum sickness, an intradermal injection of 0.1 c.c. of the serum or tuberculin caused no local reaction. This failure of the otherwise regular reaction is accepted as an evidence of antianaphylaxis. The details of eleven cases are tabulated.

52. **Diphtheria.**—Knöspel compares the results of small, moderate, and large doses of antitoxin in 443 cases of diphtheria at Karlsbad in the last ten years. No signs of anaphylaxis were ever noted. In the severer cases, large intramuscular and intravenous doses—up to a maximum of 10,000 units—seemed to reduce the death rate considerably. Heart trouble and paralysis in or following diphtheria often responded favorably to continued antitoxin treatment. To ward off anaphylaxis, serum from another source may be used, or Friedberger's method may be followed, namely, to inject, after the tenth day, a few drops subcutaneously and then, a few minutes later, inject the whole of the remainder into a muscle.

53. **Elimination of Iodin in the Urine.**—Amstad found that in 4 infants, after a dose of 0.1 gm. potassium iodid, 67.5 per cent. of the iodin was recovered from the urine in the course of thirty hours. After a dose of 0.2 gm. potassium iodid, 11 other children between 3 and 5 eliminated 44.5 per cent. in thirty hours; 13 between 5 and 10, 44.3 per cent.; and 4 adults, 68.2 per cent. After the thirtieth hour only traces could be detected if any. Infants and adults thus eliminated the largest proportion of iodin; in the infants it ranged from 63.8 to 72.2 per cent. and in the adults from 66.5 to 71 per cent., while the older children under 5 seemed to retain all but 37 to 49.8 per cent., and those between 5 and 10 all but 41.3 to 48 per cent. The elimination in all began a few minutes after injection of the drug and reached its highest point the second hour; four-fifths of the total was eliminated in the first twelve hours.

Medizinische Klinik, Berlin

March 14, XI, No. 11, pp. 293-322

56 *Effect of Fatigue on the Heart. (Ermüdungsherzen im Felde.) W. His.
57 *Treatment of Gangrenous and Phlegmonous Wounds with Artificial Gastric Juice. K. Funke.
58 Dental Prostheses for the Wounded. (Die Versorgung des Feldheeres mit zahnärztlicher Hilfe.) E. Feiler.
59 Misleading Responses to Tests for Typhoid in Those Inoculated Against Typhoid. Mülhens.
60 Diabetes After Vaccination. (Ueber Diabetes mellitus im Anschluss an Vaccination.) H. Eichhorst.
61 *Nervous Symptoms and Vagotony in the Healthy. (Vorkommen nervöser Symptome und vagotonischer Erscheinungen bei Gesunden.) A. Fein.

March 21, No. 12, pp. 323-350

62 Predisposition to Hemorrhage in Typhoid. K. Walko. Continued.
63 *Treatment of Wounds of Soft Parts. (Behandlung infizierter Weichteilwunden.) W. Burk.
64 Measures to Prevent and Reduce Crippling. (Aufgaben der medico-mechanischen Nachbehandlung der Kriegsverletzungen und ihre Durchführbarkeit.) F. Kirchberg.
65 Circle of Injections of Oxygen to Prevent and Treat Gas Phlegmons in the Field. W. Böcker.
66 *Residual Nitrogen in the Blood as Test for Kidney Functioning. (Der Reststickstoff des Bluts unter physiologischen Bedingungen, sein Verhalten bei Nephritis, Urämie, und Eklampsie, sowie seine Bedeutung für die Prüfung der Nierenfunktion.) H. Holtweg.
67 Medicolegal Study of Hairs Run Over by Train or Carriage. (Haarverletzungen durch Ueberfahren.) G. Fehsenfeld.

56. **Effect of Fatigue on the Heart.**—His has been able to examine with the Roentgen rays the various cardiovascular disturbances noted among the troops in the eighth base district. Twenty-five typical cases are described. They resemble in many respects the heart disturbances in competitive athletics, and they may be weeks or months in subsiding, both the nervous forms and the acute dilatation, and the heart long remains unusually irritable. The symptoms are about the same with the purely nervous and the organic types, but the greater or less rapidity with which they subside differs widely in the two types, especially the duration of the dyspnea. The prognosis is usually favorable, but the length of the interval before return to normal cannot be estimated with any precision; it may be as long without as with anatomic findings. Recovery depends in large measure on the correct alternation of exercise and rest. Sleep is the main factor in the cure, but otherwise bed rest is not required for more than two or three weeks at most. Digitalis is useless in the nervous form and small doses are better whenever it is indicated. Valerian is a valuable aid in treatment and should be given for a long time. Kola is often useful, as also carbonated and alternating current electric baths. Psychotherapy is often of paramount importance. If the disturbances persist after a few days' repose in a base hospital, the man should be given specialist treatment.

57. **Artificial Gastric Juice in Treatment of Gangrenous Wounds.**—Funke declares that he never witnessed such lively and healthy granulation under any other method of treatment as he is now obtaining with Freund's artificial gastric juice. He applies it only to open gangrenous or suppurating wounds, never to phlegmonous processes during the acute stage. When the wound is on the arm or foot, the part is placed in a basin containing the hydrochloric acid and pepsin, the whole kept at a constant temperature by means of a lamp or other device. At other points compresses dipped in the fluid are applied, renewed every hour. The wound is first rinsed for half an hour with a 0.2 per cent. solution of hydrochloric acid and then the artificial juice bath is applied. Freund's formula for this is 1,000 gm. of the 0.2 per cent. solution of hydrochloric acid; 20 to 50 gm. pepsin, and 5 drops of a 1 per cent. solution of dimethylamidoazobenzol. The stain is added to show whether there is still free

hydrochloric acid present; when it is all neutralized by the secretions, there is no further digestive action. The fluid should be made up fresh every two days and should not be heated above 50 C. It does not injure sound tissue, but clears off gangrenous wounds rapidly and effectually far beyond what can be realized with the continuous bath, according to his experiences with it to date.

61. **Nervous Symptoms in the Healthy.**—Fein found symptoms suggesting nervous instability surprisingly frequent in 100 supposedly healthy students. The discovery of symptoms of this kind therefore has little diagnostic import in actual nervous disease. Signs of vagotony were very rarely encountered in men, but were comparatively frequent in women.

63. **Treatment of Infected Wounds.**—Burk reviews the general principles for treatment of infected wounds in the soft parts, emphasizing the necessity for raising the region and keeping it quiet, with the joints arranged in the most favorable position for functioning in the future. With suppuration in any cavity, especially in a tendon sheath, numerous small incisions on each side and at the lowest part permit effectual drainage. He places great faith in Peruvian balsam, but for an encapsulated pus collection he prefers to swab out the cavity with concentrated phenol, neutralizing it half a minute or a minute later with alcohol. Very extensive wounds can be given open treatment to prevent any tendency to stagnation of the secretions. As the inflammation subsides, kaolin or charcoal may be found useful to help dry up the secretions. Burk has had invariably favorable experience with obstructive hyperemia applied to staphylococcus processes, but with streptococci the condition was aggravated by it.

66. **The Residual Nitrogen in the Blood.**—Hohlweg has found thoroughly reliable the technic he published in 1907 for precipitating the nitrogenous elements in the blood. He has recently been studying the residual nitrogen in the blood as an index of the functional capacity of the kidneys. In health the range is between 41 and 61 mg. in 100 c.c. of serum. In nephritis the amount was from 63 to 99, averaging higher in parenchymatous than in interstitial kidney disease. As the nephritis progressed the amount of residual nitrogen increased, running up to 120, 340 and 370 mg. testifying to the augmenting insufficiency on the part of the kidneys. Any amount over 100 mg. he regards as indicating an unfavorable prognosis. The residual nitrogen content of the serum distinguishes between true uremia and the epileptiform type in which the symptoms are the result of pressure on the brain. In this latter form, lumbar puncture or trephining arrests the symptoms; in a case of this type the residual nitrogen was only 66 mg. and full earning capacity was soon regained. In true uremia the residual nitrogen was always found in unusually large amounts in the blood. In eight cases of eclampsia the proportion was within normal limits or below; three of the cases terminated fatally. The reaction may thus serve to differentiate a chronic nephritis from eclampsia or pregnancy kidney.

Determination of the residual nitrogen in the blood is proving useful also as a means for estimating the functional capacity of the kidneys before operations. In Hohlweg's cases of one sound and one diseased kidney, the residual nitrogen was always within normal range. This was the more surprising as the pathologic conditions in the diseased kidney varied within a wide range of intensity. Even when there was not a trace of sound parenchyma left in the diseased kidney, yet the residual nitrogen content of the blood serum was persistently normal. This was also the case in eight patients, each with a single healthy kidney, long after its mate had been removed. When the second kidney is suffering from toxic influences, the residual nitrogen is liable to be a little above normal, from 62 to 73 mg., but this does not contraindicate nephrectomy, as the kidney rapidly recuperates when the toxic influence is thrown off.

He precipitates out all but the residual nitrogen by treating the blood serum with a mixture of equal parts of 1 per cent. acetic acid and 5 per cent. solution of monopotassium phosphate, until there is an acid reaction to litmus, but the congo reaction is still neutral. Then he dilutes with water, adding table salt until the total fluid is semisaturated. The nitrogen content of the filtrate is then determined by the Kjeldahl double method. It is more convenient to work with 20 c.c. of blood serum. By this technic all the non-coagulable nitrogen passes into the filtrate.

Münchener medizinische Wochenschrift, Munich

March 16, LXII, No. 11, pp. 361-392

68 *Hysteria among the Men at the Front. (Hysterie und Kriegsdienst.) R. Gaupp.
69 *Tuberculosis and the War. (Tuberkulose im Kriege.) E. Leschke.
70 *Active Military Service of Former Tuberculosis Sanatorium Patients. (Kriegsdiensttauglichkeit ehemaliger Lungenheilstättenpfleglinge.) L. Thieme.
71 *Occupational Acute Hematuria Cured by Decapsulation. (Einseitige renale Hämaturie infolge Kresolschwefelsäureintoxikation, geheilt durch Dekapsulation.) Els.
72 Efficacy of Vaccination Against Cholera. (Wert der Choleraschutzimpfung im Felde.) J. Kaup.
73 Vaccination against Typhoid. (Zur Frage der Bewertung der französischen Typhusschutzimpfung und der diagnostischen Bedeutung der Gruber-Widalschen Reaktion bei Typhusgeimpften.) H. Stursberg and F. Klose.
74 Cholera Carriers in the German Army. (Vibrionenträger im Deutschen Heere.) W. Rosenthal and E. Werz.
75 Changes in the Heart from Physical and Psychic Overexertion in the Field. (Herzbefunde bei Verwundeten und krank vom Felddienst Heimkehrenden.) C. Mirtl.
76 Functional Paralysis of the Vocal Cords in the Field. (Funktionelle Stimmbandlähmung im Felde.) H. Pape.

68. **Hysteria Among the Men in the Trenches.**—Gaupp says that, contrary to his usual practice in treating hysteria, he thinks it advisable to yield to circumstances and when a man develops a hysterical dread of returning to the front after a nervous breakdown Gaupp advises detailing him for garrison duty or service elsewhere than at the front. The shock from explosion of a shell nearby, killing their mates, has caused a number of men to be sent to the base with severe nervous breakdown. It generally proved transient, but in the predisposed was liable to persist and flare up anew if the men were sent back to the front. Their nervous systems are strong enough for ordinary life, but they collapse under the stress of war, and the fact of this inferiority will have to be accepted.

69-70. **Tuberculosis and War.**—Leschke believes that 90 per cent. and more, of rich and poor alike have some tuberculous focus somewhere. But in ordinary life the defensive forces keep it under control and it remains latent throughout or may become extinct finally. The vicissitudes of war, however, are liable to fan it into a flame or permit metastasis when the defensive forces are at a low ebb. He gives an illustrated description of some typical cases of both kinds, including one of acute miliary tuberculosis. The first signs of such metastasis should be carefully watched for and the men sent home at once for sanatorium treatment.

In contrast to the above, Thieme reports that 241 men whom he had had under treatment at the Adorf sanatorium between 1906 and 1913 are now serving in the field, apparently fully capable. This group forms 9 per cent. of the total treated during that period, and 19.6 per cent. of the men of the age suitable for military service.

71. **Toxic Hematuria Cured by Decapsulation.**—The case reported by Els knocks out another stone from the support of the conception of essential hematuria. The man's duties included cleaning cattle cars, and after seven years of this he suddenly developed tenesmus and smarting at micturition and, by the end of the week, profuse hematuria and pain in the left kidney. The cystoscope showed patches of bright red in the bladder walls, the aspect suggesting toxic action. Inquiry then elicited that for a few weeks the man had been spraying the cars with a mixture of 2 parts kresol and 1 part sulphuric acid to 60 parts water. The intense pain in the kidney was relieved by decapsulation when only slight improvement was observed under two weeks of medical measures. Recovery was soon apparently complete and there has been no further disturbance during the six months since.

Wiener klinische Wochenschrift, Vienna

March 11, XXVIII, No. 10, pp. 261-284

77 Necropsy Findings with Influenza Superposed on Typhus. R. Paltauf.
78 Operating in a Hospital Train. (Zur Frage der operativen Tätigkeit und des Verbandwechsels auf Spitalszügen.) P. v. Walzel.
79 Conservative Treatment of Severely Frozen Extremities. (Behandlung schwerer Erfrierungen.) V. Pranter.
80 Prophylaxis in War. E. Wiener. Commenced in Previous Volume.

March 18, No. 11, pp. 285-312

81 *Weight-Bearing Stump. (Tragfähigkeit des Amputationsstumpfes.) J. Ballner and A. v. Eiselsberg.
82 Frost-Bite. (Bemerkungen über Erfrierung.) G. Riehl.
83 Subfebrile Temperature at Times During Convalescence from Dysentery. N. v. Jagic.

81. **Weight-Bearing Stump.**—Von Eiselsberg is emphatic in his commendation of Bunge's technic for amputation of the leg, especially below the knee. The experiences with it in his service are reviewed here in detail, and Ranzi also gave a summary account of them at the international surgical congress held at New York last spring, reviewed in THE JOURNAL, May 2, 1914, p. 1426.

Zentralblatt für Chirurgie, Leipzig

March 20, XLII, No. 12, pp. 185-200

84 *Advice with Regard to Use of Artificial Leg. (Erfahrungen über die Benutzung des künstlichen Beines.) B. Riedel.

84. **How Best to Manage an Artificial Leg.**—Riedel urges the necessity for getting the best possible artificial leg from the very first. It is unwise to get along with a makeshift, and he advises to use crutches for the first three to six months so that the stump will have finished shriveling before the permanent artificial leg is made for it, unless one can afford two first-class prostheses of the kind. This has the advantage that one is not reduced to crutches again when the artificial leg needs repairing. He uses a rubber sponge wrapped in gauze for the stump to rest on. The stocking drawn over the stump is turned back over the top of the prosthesis and tied there, and is drawn on and off with the latter. Rubber sponge is useful to relieve pressure at any point, especially under a leather strap; leather straps stiffened by sweat should be renewed. Another minor point he mentions is to beware of knocking a hole in the front of the boot on the artificial leg by allowing it to hit against the front of stairs.

Zentralblatt für Gynäkologie, Leipzig

March 20, XXXIX, No. 12, pp. 177-188

85 *Radiotherapy of Cancer. (Zur Strahlenbehandlung des Krebses.) A. Döderlein.

85. **Radiotherapy of Cancer.**—Döderlein remarks that twelve patients are still in good health to date, that is, for more than a year since their malignant disease retrogressed under radium and mesothorium treatment. Their cancers were in an absolutely inoperable stage when this treatment was applied. Whether the cure is complete or not, even these twelve or more months of clinical health are a miraculous gain. He has been applying radiotherapy for two years and now reaffirms, more emphatically than ever, that radium and mesothorium are capable of influencing malignant disease in a manner unattainable with any other measure, operative or nonoperative. He advocates radiotherapy for even operable uterine cancers, declaring that operable cancers are the proper field for application of therapeutic radiant energy. The technic is not yet perfected, and radiotherapy is still fraught with various dangers, as he has always admitted. The dosage, the intervals, the filters, the best method of application and the length of the course of treatment—all are still in the tentative stage.

One great advantage of radiotherapy is that it can be applied without interfering with the woman's occupation; it is not necessary for her to stay in the hospital more than one day or two at first. The rest of the course can be given ambulant if necessary. The purely hypertrophic forms of cancer, especially cauliflower cancerous growths on the uterine cervix, are most amenable to radiotherapy, but all forms are influenced more or less, although it is a difficult matter to obtain any response with certain cancers. The mucosa of the rectum is so sensitive to radiotherapy that it is difficult to apply it here, and it is liable to cause serious and protracted disturbances and pain, but when the patient is persevering enough to carry the course through, the ultimate results were as good as with cancer elsewhere. He never had to resort to an artificial anus.

Zentralblatt für innere Medizin, Leipzig

March 20, XXXVI, No. 12, pp. 177-192

86 *Occult Hemorrhages in Kidney Pelvis. (Okkulte Nierenbeckenblutungen.) H. Eichhorst.

86. **Occult Hemorrhages in Kidney Pelvis.**—Eichhorst regards it as remarkable that while so much attention has been paid to the diagnostic significance of invisible blood in the stomach content and stools, its import in the urine has been overlooked. He has found that when the vomit seems entirely free of blood, and even the microscope fails to reveal any blood corpuscles, yet it may show little brownish threads and clumps like the masses of hemoglobin found in the sediment of the urine with hemorrhagic nephritis. This finding in the vomit has often revealed cancer in the stomach when there were no other reliable signs of it until the organ was opened. It has sometimes conflicted with roentgenoscopy, but time proved the accuracy of the former. Eichhorst relates that the same findings in the urine point to damage from calculi in the kidney pelvis or elsewhere, and relates an instructive case in point. The Roentgen rays showed no signs of calculi, but there was a sudden attack of pain and hematuria and then six months followed during which the patient was free from symptoms. The urine was apparently normal, but, after centrifuging, large hematin-bearing cells were found numerous in the sediment—typical heart-defect cells. Clumps of hemoglobin were also perceptible—all testifying to occasional minute hemorrhages from irritation from calculi. They would have escaped detection entirely if the microscope had not been used. Such findings in the urine suggest that the "heart-defect cells" may proceed from the white corpuscles, as seems to be the case in the occult kidney pelvis hemorrhages.

Gazzetta degli Ospedali e delle Cliniche, Milan

March 21, XXXVI, No. 23, pp. 353-368

87 Diagnosis of Real and Apparent Death in the Field. (Diagnosi di morte apparente o reale ed inumazione di soldati deceduti sul campo.) L. C. Massini.

Policlinico, Rome

January 31, XXII, No. 5, pp. 149-184

88 Operative Treatment of Glaucoma. (Sulla technica della cheratosclero-iridectomia.) Q. Di Marzio.

March, Surgical Section, No. 3, pp. 105-156

89 Histologic Changes in Transplant of Rabbit Brain Tissue. (Istopatologia del reinnesto cerebrale parziale.) L. Durante.
90 Recovery after Separation of Mesentery and Resection of Cecum and Ascending Colon. (Dimostrazione di un grado (7 cm.) di distacco del mesenterio compatibile colla vitalita dell'ansa.) P. Bastianelli.

March, Medical Section, No. 3, pp. 97-144

91 *Influence of Tonsil Extract on the Blood Picture. (Influenza dell'estratto di tonsille palatine sulla crasi sanguigna.) C. B. Farmachidis and A. Vattuone.
92 Pancreas Secretion Increases after Splenectomy. (Influenza della milza sulla funzione pancreatica.) U. Lombroso and P. Manetta.
93 Roentgenologic Study of Duodenal Ulcer. L. Manginelli. Commenced in No. 1.
94 *Improved Technic for Preservation of Brains. (Modificazione del metodo Giacomini per la conservazione dell'encefalo.) A. Giannelli.

91. **Tonsil Extract Treatment.**—In the experimental research and three clinical experiences reported, the numbers of both white and red corpuscles increased under the influence of tonsil extract treatment. Previous research described points to a glycolytic action from tonsil extract, and also demonstrated that this extract is able to arrest the fatal toxic action of epinephrin.

94. **Preservation of Brains.**—Giannelli states that brains preserved for seven years by the technic described have shown no changes, while with other methods they have grown hard and brittle or else the brain has to be kept permanently covered with fluid. After removal of the meninges, the brain was placed for fifteen days in a 5 or 10 per cent. solution of formaldehyd, using not less than five liters, with cotton on the floor of the vessel. It was then transferred to alcohol for the same length of time, after which it was soaked in glycerin for a month. The brain was then placed on a slanting sheet of glass to drain off the fluid. The relations between the fissures and convolutions are not modified by this treatment and the brain afterward does not change.

Riforma Medica, Naples

March 20, XXXI, No. 12, pp. 309-336

95 *Radium Treatment of Rectal Cancer. C. Pellizzari.
96 Functional Hemispasms. P. Ciuffini.
97 Experimental Research on Intramuscular Injection of Ether. B. Formigini. To be continued.
98 Syndrome Simulating Peritonitis after Traumatic Hemorrhage from Suprarenal Capsule. (Studio della insufficienza surrenale acute.) R. Mosti. To be continued.

95. **Radium Treatment of Cancer of Rectum.**—In the case reported the rectum was almost entirely obstructed by the cancer, about 8 cm. above the anus, and adhesions to neighboring organs rendered operative treatment too dangerous. The man was given a course of radium treatment in 1913 and again in 1914, and soon regained his strength and increased in weight. There is still a slight bulging of the rectum wall at the spot, but the malignant disease has otherwise completely retrogressed.

Tumori, Rome

January and February, IV, No. 4, pp. 373-508

99 Peculiar Metaplasia of Tissues in Cancer; Four Cases. (Tumori maligni eteroplastici.) E. Fambri.
100 Perithelioma of the Ovary in Young Woman, and Hard Ovarian Tumors in General. A. Falco.
101 Xanthomatosis in Calcified Lipoma. (Steatosi da lipoidi birifrangenti in un lipoma calcificato del cordone spermatico.) F. Niosi.

Brazil-Medico, Rio de Janeiro

March 1, XXIX, No. 9, pp. 65-72

102 *Nasopharyngitis Cause of Protracted Fever in Infants. J. Marinho.

March 8, No. 10, pp. 73-80

103 Uncinaria Carinii N. Sp. L. Travassos.
104 *Leishman Ulceration in Mouth, Throat, Vulva and Vagina. (Leishmaniose cavitaria.) A. A. da Matta.
105 *Tests of Kidney Functioning. (Contribuição ao estudo da capacidade funccional do rim. A prova da phenolsulfophthaleina.) L. Pezzana.

102. **Fever from Nasopharyngitis in Infants.**—Marinho bases the diagnosis mainly on exclusion of other causes for long drawn out fever in an infant and the discovery of enlarged glands in the neck. The fever may drag along for weeks and the glands may keep swollen and painful long after the nose and throat have returned to apparently normal conditions. The glands never show any disposition to suppurate, even although they may be tender and painful. An incision never brings pus and the fever still keeps up. The type of fever is irregular, and afebrile days may intervene. A discharge from the ear is at times the only other sign of anything wrong. Most clinicians ascribe the fever to the ear trouble, but Marinho insists that an otitis does not send up the temperature unless there are complications. He has encountered cases of protracted fever through months for which the chronically enlarged glands were apparently the only explanation.

104. **Leishmaniosis of Mouth and Vagina.**—The ulcerative affection was of four years' standing in the case described. It began in the nostril and soon had invaded the mouth and throat and also the genital organs. The microbe involved was the *Leishmania brasiliensis viannae*, and treatment by the Brazilian method was instituted, namely, injections of 30 c.c. of tartar emetic in a series of four, repeated four times. Improvement was soon manifest and progressing, when facial phlebitis and thrombosis developed, speedily fatal. This treatment with antimony and potassium tartrate seems to be proving specific in Brazil.

105. **Tests of Kidney Functioning.**—Pezzana discusses the various tests in vogue, lauding the phenolsulphonephthalein technic as superior in various respects to all others. He has applied it in thirteen cases of kidney disease and a series of controls, making the injections in the buttocks; his figures were a little lower than those of Rowntree and Geraghty, possibly on account of the site of the injection. Otherwise his findings confirmed all their statements and corroborated the simplicity, ease and reliability of the technic.

Nederlandsch Tijdschrift voor Geneeskunde, Amsterdam

March 20, I, No. 12, pp. 881-960

106 Vaccination against Typhoid; Six Hundred Cases. (Klinische en serologische ervaringen over typhusenting.) H. Aldershoff.
107 *Production of Bile Pigment Outside the Liver. A. A. H. Van den Bergh and J. Snapper. Commenced in No. 11.

March 27, No. 13, pp. 961-1040

108 *Experimental Study of Heart Rhythm. (De extrasystole, compensatoire pauze en rhythme-overzetting.) S. de Boer.
109 Bilateral Atrophy of the Optic Nerve after Fracture of the Base of the Skull. G. ten Doesschate and A. de Kleijn.

107. **Production of Bile Pigment Outside of the Liver.**—It is generally accepted now that in extravasated blood left in quiet between the tissues or in some cavity, there is, in time, production of bile pigment. The amount of bilirubin thus produced is, of course, very minute, but its presence in the accumulated blood may be regarded as a sign that the extravasation is not of quite recent occurrence, that is, if the bilirubin content of the fluid is higher than that of the blood serum. The first installment of this article was reviewed in these columns April 24, abstract 118.

108. **The Extrasystole.**—De Boer's study of the compensating pause with extrasystole is accompanied by numerous tracings showing the response to electric excitation. The work issues from the physiology laboratory of the University of Amsterdam, where de Boer is assistant. The experiments were made on frogs placed under the influence of a few drops of a 1 per cent. solution of veratrin acetate injected into the peritoneum.

Hospitalstidende, Copenhagen

December 2, LVII, No. 48, pp. 1417-1440

110 *The Skin Reaction in Syphilitics to Various Organ Extracts Not Specific. H. Boas and J. Stürup.
111 *Superior Immersion Fluid. (En ny Immersionsvædske.) V. Jensen.

110. **Skin Reaction in Syphilitics.**—Boas and Stürup have been testing luetin and extracts of three syphilitic and of five nonsyphilitic organs to determine whether there was a specific skin reaction in the syphilitic. A reaction was observed in 5 of 248 nonsyphilitics. The response was negative to all the extracts in the 27 syphilitics in the first stage and positive with all in the 25 in the third stage of syphilis. There was also positive reaction to one or more of the extracts in 18 and negative in 139 in the second stage. The tests were positive in 5 and negative in 23 who had acquired syphilis within three years; positive in 7 and negative in 3 over three years, and positive in all of six cases of inherited syphilis and in one of tabes. Positive results were obtained with luetin less frequently than with other extracts of organs, syphilitic or otherwise. The findings all testify that in syphilis the skin is modified in some way which makes it respond to skin tests, regardless of the nature of the organ extract.

111. **Immersion Fluid.**—Jensen has been using for four years a mixture of alpha brom-naphthalin, 24 parts, with 76 parts liquid paraffin and has found it extremely satisfactory for the immersion fluid. He tests it to get the refraction index the same as that of the ordinary immersion oil. It has the advantage over the latter that it flows easily, keeps perfectly, even uncovered; can be easily removed at any time, early or late; it does not dry out, and the specimen keeps its color perfectly.